

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE n.a. - See Section II

EFFECTS OF OVEREXPOSURE As for Glycol Ethers and Ethanolamine.

EMERGENCY AND FIRST AID PROCEDURES Swallowing; contact physician immediately; eye contact; flush with water for 15 minutes - contact physician; skin contact; flush with copious amounts of water; inhalation; move to fresh air.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY *Materials to avoid:* strong oxidants

HAZARDOUS DECOMPOSITION PRODUCTS Unknown

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Flush area with cold water into waste treatment system

WASTE DISPOSAL METHOD Contact Shipley Technical Service Department

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* n.a.

VENTILATION	LOCAL EXHAUST	Local exhaust recommended	SPECIAL
	MECHANICAL <i>(General)</i>		OTHER

PROTECTIVE GLOVES yes EYE PROTECTION chemical goggles

OTHER PROTECTIVE EQUIPMENT suitable protective clothing

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Treat as a combustible, alkaline cleaner. Store in a dry area, away from strong oxidants, at 50-90°F. Do not store in direct sunlight. Keep sealed when not in use.

OTHER PRECAUTIONS

MATERIAL SAFETY
DATA SHEET

* HEALTH *IGNITABILITY*
* 2 * 3 *
* * *

* REACTIVITY *PERSISTENCE *
* 3 * U *
* * *

MSDS #: 6
HMFS #: 6542
DISCLOSURE CODE: U/S
CREATION DATE: 10/15/85
REVISION NUMBER: 0 REVISION DATE: 10/15/85
REPORT ORIG/LOC: AT&T-T/Princeton, N.J.; AT&T-BTL/MH
INITIAL: _____

; EMERGENCY CONTACT: S. L. Malish
; EMERGENCY TELEPHONE: 201-886-1258

AT&T Formula 92

MOLECULAR FORMULA/MIXTURE: mixture

I - MATERIAL IDENTIFICATION

PRODUCT TYPE: reactive acrylic polymer
TRADE NAME: PHP-92
PRECAUTIONARY LABELING INFORMATION: Do not take internally. Avoid eye and skin
contact. Flammable mixture.

II - HAZARDOUS MATERIALS

MATERIAL OR COMPONENT	PERCENT (X/X)	CAS REG #	TLV/PEL
1: methyl ethyl ketone	50 w/w	78-93-3	200 ppm
2: (MEK)			
3: Proprietary ingred.	50 w/w		
4:			

III - PHYSICAL PROPERTIES

PHYSICAL STATE (color, appearance): purplish red viscous liquid ODOR: MEK ester
SPECIFIC GRAVITY (H2O=1): 0.95356/ml VAPOR DENSITY (AIR=1): > 1
BOILING POINT: 178 F. MELTING POINT: FREEZING POINT
VAPOR PRESSURE: 75.6 @ 22.5 Deg. C. SOLUBILITY IN WATER: insoluble
EVAPORATION RATE: 0.36 vs water PERCENT VOLATILES: 12 v/v PH:

IV - HEALTH HAZARD SUMMARY

PRIMARY ROUTES OF EXPOSURE (oral, skin, inhalation, other): inhalation, skin

ACUTE TOXICITY STUDIES

LD50 (ORAL): non-toxic

LD50 (DERMAL): non-toxic

LC50 (INHALATION):

DERMAL IRRITATION: no irritation

EYE IRRITATION: moderate

AMES: negative

DERMAL SENSITIZATION:

OTHER STUDIES:

GENETIC TOXICITY POTENTIAL:

EFFECTS OF HUMAN OVEREXPOSURE

ACUTE: irritation of the eyes, nose and throat, dermatitis, depression, head ache, drowsiness, dizziness

CHRONIC: numbness of the fingers and arms; these symptoms and the acute above are caused by the MEK component

EMERGENCY FIRST AID PROCEDURES

EYES: Flush with water for 15 minutes. Seek medical attention.

SKIN: Wash with soap and water immediately.

INHALATION: Remove to fresh air. Artificial respiration if not breathing

INGESTION: Seek medical attention.

NOTES TO PHYSICIAN: Eye, skin irritant, and sensitization effects can be delayed. Inhalation effects caused by MEK.

V - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 20 Deg. F. TEST METHOD: TCC

PCT FLAMMABILITY LIMIT: LEL: 1.8

UEL:

AUTO IGN TEMP: EXTINGUISHING MEDIA: foam, carbon dioxide, dry chemical

FIRE/EXPLOSION HAZARDS/PRODUCTS OF COMBUSTION: Dangerous fire hazard. Rapid and violent polymerization may occur at elevated temperatures. During fire containers must be cooled with water.

VI - REACTIVITY DATA

STABILITY: unstable CONDITIONS TO AVOID: prolonged temperatures above 90 deg. F. INCOMPATIBILITY: oxidizing agents, bases

HAZARDOUS DECOMPOSITION PRODUCTS: carbon monoxide and other toxic vapors

POLYMERIZATION: may occur

CONDITIONS TO AVOID: see above

VII - VENTILATION REQUIREMENTS

GENERAL VENTILATION ADEQUATE: yes

LOCAL EXHAUST (preferred or mandatory):

COMMENTS: Keep solvents below PEL/TLV

VIII - PERSONAL PROTECTIVE EQUIPMENT

GLOVES REQUIRED: yes TYPE: polyethylene

COMMENTS:

EYE PROTECTION REQUIRED: yes TYPE: safety glasses with side shields

COMMENTS:

RESPIRATORS REQUIRED: no TYPE:

COMMENTS: Remove and wash contaminated clothing; discard contaminated shoes.

IX - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Remove all flames and spark sources. Apply absorbant material to spill and clean area immediately.

WASTE DISPOSAL METHOD: Do not incinerate closed containers. To avoid spontaneous combustion, remove contaminated product.

Note: Only authorized personnel directly involved with clean-up procedures should be allowed to enter spill areas. All such individuals must wear appropriate protective equipment.

XII - MANUFACTURING INFORMATION

NAME OF MANUFACTURER(S): Manuf. for AT&T Technologies CONTACT:

ADDRESS: 1 Oak Way

CITY: Berkeley Hgts.

STATE: NJ ZIP: 07922

TELEPHONE:

XIII - GENERAL INDUSTRIAL HYGIENE PRECAUTIONS

In accordance with good industrial practice, handle with care and avoid unnecessary personal contact. Avoid contact with eye and prolonged or repeated skin contact. Avoid continuous or repetitive breathing or dust. Keep container closed when not in use and during transport. Use only with adequate ventilation. Wash after handling, and before eating, drinking or smoking

While information in this document has been compiled from reference materials and other sources believed to be reliable, its accuracy and completeness is not guaranteed, nor is any responsibility assumed or implied for any loss or damage resulting from inaccuracies or omissions. Any specific evaluation will involve professional judgement by the user's industrial hygiene personnel.

Note: Blank entries indicate information is either unavailable or unknown.



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME Potassium Chloride	FORMULA KCl
SYNONYM OR CROSS REFERENCE	CAS NO: 7447-40-7

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD
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SECTION III . PHYSICAL DATA

BOILING POINT	MELTING POINT
VAPOR PRESSURE	SPECIFIC GRAVITY
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Soluble	EVAPORATION RATE (_____ = 1)
APPEARANCE White granular; odorless	

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) Non-flammable	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA			
SPECIAL FIRE-FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE //
HEALTH HAZARDS Non-toxic, non-hazardous
FIRST AID PROCEDURES

CHEMICAL NAME

SECTION VI . REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII . SPILL AND DISPOSAL PROCEDURES

SPILLS

DISPOSAL

SECTION VIII . PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

VENTILATION	LOCAL	SPECIAL
	MECHANICAL (general)	OTHER
PROTECTIVE GLOVES		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		

SECTION IX . HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

SECTION X . MISCELLANEOUS INFORMATION

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Date issued: _____ Revision: _____ Approved by: R. M. Mitchell
Manager, Quality Assurance

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary. We reserve the right to revise Material Safety Data Sheets from time to time as new technical information becomes available. The user has the responsibility to contact the company to make sure that the sheet is the latest one issued.



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Potassium Cyanide	FORMULA KCN
SYNONYM OR CROSS REFERENCE (Cyanide of Potassium)	CAS NO: 151-50-8

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL Potassium Cyanide Hydrogen Cyanide	NATURE OF HAZARD Violent poison
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SECTION III. PHYSICAL DATA

BOILING POINT	MELTING POINT 635 °C.
VAPOR PRESSURE	SPECIFIC GRAVITY 1.52 at 16 °C.
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY 50 g/100g H ₂ O	EVAPORATION RATE (_____ = 1)
APPEARANCE White, amorphous, deliquescent solid, faint bitter almond-like odor	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA			
SPECIAL FIRE-FIGHTING PROCEDURES			

UNUSUAL FIRE AND EXPLOSION HAZARD Not combustible itself. It will become very combustible if HCN gas is evolved in contact with acids.

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE

TWA: 5mg(CN)/m³(skin) orl-rat LD₅₀: 10 mg/kg scu-rat LD₅₀: 9 mg/kg 15

HEALTH HAZARDS Poisonous! May be fatal by swallowing, inhalation or absorption through injured skin.

FIRST AID PROCEDURES Immediately wash contaminated area of the body with soap and abundant quantities of water. Administer artificial respiration and oxygen. Give amyl nitrite pearls by inhalation every five minutes. Give 10cc of 3% NaNO₂ intravenous over a period of 2 min. Then 50cc of 25% sodium thiosulfate intravenously. If patient swallows, induce vomiting by administering 1% sodium thiosulfate orally.

CHEMICAL NAME

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Any contact with the skin and chemicals like acids and oxidizing materials.
	STABLE	X	

INCOMPATABILITY (materials to avoid)

Acids and acid syrups, alkaloids, chloral hydrate, iodine, metallic salts, permanganates, chlorates, peroxides.

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen cyanide gas is evolved in contact with acids.

HAZARDOUS POLYMERIZATION	MAY OCCUR	X	CONDITIONS TO AVOID Contact with ammonical silver resulting in explosive silver fulminate (2) NaNO_2 , KNO_3 - Diacin. Explosive
	WILL NOT OCCUR		

SECTION VII. SPILL AND DISPOSAL PROCEDURES

SPILLS

Collect by sweeping with a broom onto a paper sheet. Dispose by burning the paper.

DISPOSAL Add the cyanide with stirring to strong alkaline solution of calcium hypochlorite. Maintain an excess sodium hydroxide and calcium hypochlorite. Let stand 24 hours. Flush the cyanate down the drain with large excess of water providing environmental regulations permit.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Self-contained breathing apparatus

VENTILATION	LOCAL Preferable	SPECIAL
	MECHANICAL (general)	OTHER
PROTECTIVE GLOVES Rubber gloves	EYE PROTECTION Safety glasses	

OTHER PROTECTIVE EQUIPMENT

Approved working clothes, eyebath, safety shower

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Absorbs carbon dioxide and moisture from air and slowly decomposes. Keep in tightly closed container and protected from light. Store in a dry area. Use with adequate ventilation.

SECTION X. MISCELLANEOUS INFORMATION

Do not breathe gas or dust. Do not get in eyes, on skin, or on clothing.

Date issued: _____ Revision: 16 Approved by R. M. Mitchell
Manager, Quality Assurance

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MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

CHEMICAL NAME

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME Potassium Ferricyanide	FORMULA $K_3Fe(CN)_6$
SYNONYM OR CROSS REFERENCE Red prussiate of potash Red potassium prussiate Potassium hexacyanoferrate (III)	CAS NO: 13746-66-2

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD
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SECTION III . PHYSICAL DATA

BOILING POINT	MELTING POINT Decomposes
VAPOR PRESSURE	SPECIFIC GRAVITY 1.894 at 17°C.
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Slowly soluble in 2.5 parts cold water	EVAPORATION RATE (_____ = 1)
APPEARANCE Bright red, lustrous crystals or powder	

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA			
SPECIAL FIRE-FIGHTING PROCEDURES			

UNUSUAL FIRE AND EXPLOSION HAZARD Dangerous when heated to decomposition or on contact with acid or acid fumes, it will emit highly toxic fumes of cyanides.

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE

HEALTH HAZARDS
Harmful if swallowed.

FIRST AID PROCEDURES If swallowed, if conscious, induce vomiting. Call a physician.

SECTION VI . REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (materials to avoid)

Ammonia, chromic anhydrides, acids and acid fumes

HAZARDOUS DECOMPOSITION PRODUCTS

Toxic fumes of cyanides

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII . SPILL AND DISPOSAL PROCEDURES

SPILLS Collect in a beaker. Dissolve in large amount of water. Add soda ash and mix. Neutralize with 6M-HCl. Wash down drain with excess water.

DISPOSAL Add slowly to a large container of water. Stir in slight excess of soda ash. Let stand 27 hours. Decant or siphon into another container. Neutralize with 6M-HCl. Wash down drain providing environmental regulations permit. The sludge may be added to land fill.

SECTION VIII . PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER

PROTECTIVE GLOVES

Rubber gloves

EYE PROTECTION

Safety glasses

OTHER PROTECTIVE EQUIPMENT

Approved working clothes

SECTION IX . HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Keep in tightly closed, light-resistant container. Wash thoroughly after handling.

SECTION X . MISCELLANEOUS INFORMATION

Avoid contact with eyes, skin, and clothing.

Date issued: 3/3/83Approved by R. M. Mitchell
Manager, Quality Assurance

Revision No. & Date issued: _____

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MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

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SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME

Potassium Hydroxide

FORMULA

KOH

SYNONYM OR CROSS REFERENCE

Caustic Potash

CAS NO: 1310-58-3

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD

SECTION III. PHYSICAL DATA

BOILING POINT
1320-1324°C.

MELTING POINT
360.4 ± 0.7

VAPOR PRESSURE
1 mm @ 719°C.

SPECIFIC GRAVITY
2.044

VAPOR DENSITY (AIR=1)

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY
Soluble

EVAPORATION RATE
(_____ = 1)

APPEARANCE
White solid

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)

FLAMMABLE LIMITS

Lower

Upper

FIRE EXTINGUISHING
MEDIA

SPECIAL FIRE-FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARD

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE

air: TWA 2 mg/M³

HEALTH HAZARDS

Poison. Causes severe burns. May be fatal if swallowed.

FIRST AID PROCEDURES In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If swallowed, if conscious, give water with large amount of diluted vinegar, lemon or orange juice. Follow with milk or whites of eggs beaten with water. Call a physician.

CHEMICAL NAME

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (materials to avoid) Acetylene, air, Aluminum, Bromide, Boric Acid, Bromine, Carbon Dioxide, Cadmium Bromide, Cadmium Fluoride, Charcoal, Carbon Tetrachloride, Graphite, Alkali metals, Zinc Bromide, Phosphorous, Water, Potassium Peroxide			
HAZARDOUS DECOMPOSITION PRODUCTS			
See MCA-SD-10			

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES

SPILLS

Carefully sweep up and isolate. Dilute with water and neutralize with 6M-HCl.

DISPOSAL

Dispose above solution through waste treatment plant or in accordance with local environmental regulations.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER
PROTECTIVE GLOVES Rubber gloves		EYE PROTECTION Large face shield
OTHER PROTECTIVE EQUIPMENT Approved working clothes		

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Keep in tightly closed container. While making solutions, add slowly to surface solution to avoid violent spattering.

SECTION X. MISCELLANEOUS INFORMATION

Do not get in eyes, on skin, on clothing. Avoid breathing dust or mist.

Date issued: 1/28/83 Revision: _____ Approved by: R. M. Mitchell
Manager, Quality Assurance

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MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

CHEMICAL NAME

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Potassium Hydroxide [®]	FORMULA KOH
SYNONYM OR CROSS REFERENCE (Caustic Potash)	CAS NO: 1310-58-3

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD
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SECTION III. PHYSICAL DATA

BOILING POINT 1320-1324°C.	MELTING POINT 360.4 ± 0.7
VAPOR PRESSURE 1 mm @ 719°C.	SPECIFIC GRAVITY 2.044
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Soluble	EVAPORATION RATE (_____ = 1)
APPEARANCE White solid	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA			
SPECIAL FIRE-FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE air: TWA 2 mg/M ³	22
HEALTH HAZARDS Poison. Causes severe burns. May be fatal if swallowed.	
FIRST AID PROCEDURES In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If swallowed, if conscious, give water with large amount of diluted vinegar, lemon or orange juice. Follow with milk or whites of eggs beaten with water. Call a physician.	

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (materials to avoid) Acetylene, air, Aluminum, Bromide, Boric Acid, Bromine, Carbon Dioxide, Cadmium Bromide, Cadmium Fluoride, Charcoal, Carbon Tetrachloride, Graphite, Alkali metals, Zinc Bromide, Phosphorous, Water, Potassium Peroxide

HAZARDOUS DECOMPOSITION PRODUCTS

See MCA-SD-10

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES

SPILLS

Carefully sweep up and isolate. Dilute with water and neutralize with 6M-HCl.

DISPOSAL

Dispose above solution through waste treatment plant or in accordance with local environmental regulations.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER
PROTECTIVE GLOVES Rubber gloves		EYE PROTECTION Large face shield
OTHER PROTECTIVE EQUIPMENT Approved working clothes		

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Keep in tightly closed container. While making solutions, add slowly to surface solution to avoid violent spattering.

SECTION X. MISCELLANEOUS INFORMATION

Do not get in eyes, on skin, on clothing. Avoid breathing dust or mist.

Date issued: 1/28/83 Revision: _____ Approved by: R. M. Mitchell
Manager, Quality Assurance

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1987
JAN
POTASSIUM IODIDE

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POTASSIUM IODIDE
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POTASSIUM IODIDE

MATERIAL SAFETY DATA SHEET

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CAT NO: P410100

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7681-11-0

SUBSTANCE: **POTASSIUM IODIDE**

TRADE NAMES/SYNONYMS: POTIDE; KNOLLIDE; KI-N; P-410; P-412

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: I-K MOL WT: 166.00

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: POTASSIUM IODIDE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: COLORLESS OR WHITE, DELIQUESCENT, GRANULES OR POWDER WITH

A STRONG, BITTER, SALINE TASTE BOILING POINT: 2426 F (1330 C)

MELTING POINT: 1258 F (681 C) SPECIFIC GRAVITY: 3.1

VAPOR PRESSURE: 1 MMHG @ 745 C PH: 6-9.2 (5% SOLUTION)

SOLUBILITY IN WATER: 127.5%

SOLVENT SOLUBILITY: ALCOHOL, GLYCOL, ACETONE, GLYCEROL, AMMONIA

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NOT APPLICABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

1862 MG/KG ORAL-MOUSE LDLO; 120 MG/KG INTRAVENOUS-RAT LDLO; 1117 MG/KG INTRA-
PERITONEAL-MOUSE LDLO; MUTAGENIC DATA (RTECS); CARCINOGEN STATUS: NONE.
IODIDE SALTS ARE EYE, MUCOUS MEMBRANE, AND SKIN IRRITANTS AND SKIN SENSIT-
IZERS. CHRONIC INGESTION MAY CAUSE A MILDLY TOXIC SYNDROME KNOWN AS "IODISM".

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.

ACUTE EXPOSURE- INHALATION OF DUST MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- NO DATA AVAILABLE. MAY CAUSE IRRITATION. SEE ANIMAL
MUTAGENIC AND REPRODUCTIVE REFERENCE IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND
AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT/SENSITIZER.

— ACUTE EXPOSURE- MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE SENSITIVITY DERM-
ATITIS, LARYNGEAL EDEMA, SERUM SICKNESS WITH LYMPH NODE
ENLARGEMENT, AND JOINT PAIN AND SWELLING.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION IMMEDIATELY.

EYE CONTACT:

IRRITANT.

ACUTE EXPOSURE- MAY CAUSE SLIGHT IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

CORROSIVE.

ACUTE EXPOSURE- IODIDE SALTS ACT PRINCIPALLY AS EXPECTORANTS AND DIURETICS.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

POTASSIUM IODIDE-

BROMINE PENTAFLUORIDE: VIOLENT REACTIONS, OFTEN WITH IGNITION AT AMBIENT OR SLIGHTLY ELEVATED TEMPERATURES.

CHLORINE TRIFLUORIDE: VIOLENT REACTIONS, OFTEN WITH IGNITION AT AMBIENT OR SLIGHTLY ELEVATED TEMPERATURES.

TRIFLUOROACETYL HYPOFLUORITE: EXPLODES, UNLESS GREATLY DILUTED WITH NITROGEN, ON CONTACT WITH AQUEOUS POTASSIUM IODIDE.

FLUORINE PERCHLORATE GAS: EXPLOSION ON CONTACT WITH POTASSIUM IODIDE SOLUTION.

PERCHLORIC ACID: VIOLENT REACTION.

ALKALI METALS: VIOLENT REACTION.

STRONG OXIDANTS: VIOLENT REACTION.

2-DIISOPROPYL PEROXYDICARBONATE: INSTANT DECOMPOSITION.

DIAZONIUM SALTS: FORMATION OF AN UNSTABLE AND EXPLOSIVE PRODUCT.

DECOMPOSITION:

NOT APPLICABLE: BOILS AWAY UNCHANGED AT 1330 C.

POLYMERIZATION:

NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS MENTIONED ABOVE.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

NO SPECIAL PRECAUTIONS INDICATED.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:

HIGH LEVELS- SUPPLIED-AIR RESPIRATOR.
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE
OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT
REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS
SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 03/20/85 REVISION DATE: 04/26/85

-ADDITIONAL INFORMATION-

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST
INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF
MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO
SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS
SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE
INFORMATION FOR THEIR PARTICULAR PURPOSES.



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

CHEMICAL NAME

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME

Potassium Iodide

FORMULA

KI

SYNONYM OR CROSS REFERENCE

CAS NO: 7681-11-0

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD

SECTION III . PHYSICAL DATA

BOILING POINT
1330°C.

MELTING POINT
686°C.

VAPOR PRESSURE

SPECIFIC GRAVITY
3.13

VAPOR DENSITY (AIR=1)

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY
Soluble

EVAPORATION RATE
(_____ = 1)

APPEARANCE
Colorless or white cubical crystals, granules or powder

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)

FLAMMABLE LIMITS

Lower

Upper

FIRE EXTINGUISHING
MEDIA

SPECIAL FIRE-FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARD

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE
orl-mus LDLO: 1862 mg/kg

HEALTH HAZARDS
Harmful if swallowed

FIRST AID PROCEDURES
If swallowed, if conscious, immediately induce vomiting and call a physician.

SECTION VI. REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (materials to avoid)

Alkaloidal salts, chloral hydrate, metallic salts.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII. SPILL AND DISPOSAL PROCEDURES

SPILLS

Carefully sweep up and remove. Flush spill area with water.

DISPOSAL

Dispose at a landfill site if local environmental regulations permit.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Use respiratory protection if dusts are involved.

VENTILATION

LOCAL

SPECIAL

X

MECHANICAL (general)

OTHER

X

PROTECTIVE GLOVES

EYE PROTECTION

Rubber gloves

Safety glasses

OTHER PROTECTIVE EQUIPMENT

Approved protective work clothes.

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Store in well-closed, light-resistant container in a dry area. Avoid contact with eyes and prolonged contact with skin. Wash thoroughly after handling.

SECTION X. MISCELLANEOUS INFORMATION

Date issued: 8/3/83

Approved by: R. M. Mitchell
Manager, Quality Assurance

Revision No. & Date issued:

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary. We reserve the right to revise Material Safety Data Sheets from time to time as new technical information becomes available. The



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME

Potassium Nitrate

FORMULA

KNO_3

SYNONYM OR CROSS REFERENCE

Saltpeter
Niter

CAS NO: 7757-79-1

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD

SECTION III. PHYSICAL DATA

BOILING POINT

Decomposes about 400°C.

MELTING POINT

337°C.

VAPOR PRESSURE

SPECIFIC GRAVITY

2.11

VAPOR DENSITY (AIR=1)

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY

Soluble

EVAPORATION RATE

(_____ = 1)

APPEARANCE

Colorless crystals

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)

FLAMMABLE LIMITS

Lower

Upper

FIRE EXTINGUISHING

MEDIA Use water spray, dry chemical, carbon dioxide

SPECIAL FIRE-FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARD

Strong oxidizer; contact with other material may cause fire

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE

LD₅₀: unknown

HEALTH HAZARDS

Causes irritation. Harmful if swallowed.

FIRST AID PROCEDURES If swallowed, if conscious, induce vomiting and call a physician. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water.

CHEMICAL NAME

27

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Sodium Acetate and Tartrates; Sodium Phosphite; Lead Nitrate; Sodium Hyposulfite; Lead Phosphite; Tin; Solder; Tin Plate; Stannates; Organic Material; Strong Oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES**SPILLS**

Carefully sweep up and isolate spill. Dilute with sufficient water. Add soda ash. Mix and neutralize with 6M-HCl.

DISPOSAL

Dispose at a waste treatment plant providing local environmental regulations permit.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Self-contained breathing apparatus

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER

PROTECTIVE GLOVES

Rubber gloves

EYE PROTECTION

Safety glasses

OTHER PROTECTIVE EQUIPMENT

Approved working clothes

SECTION IX. HANDLING AND STORAGE PRECAUTIONS**STORAGE & HANDLING**

Keep from contact with clothing and other combustible materials. Keep in tightly closed container in a cool place away from heat and combustible materials and organics. Avoid contact with eyes, skin, clothing. Wash thoroughly after handling.

SECTION X. MISCELLANEOUS INFORMATION

Date issued: _____ Revision: _____ Approved by R. M. Mitchell
Manager, Quality Assurance

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary. We reserve the right to revise Material Safety Data Sheets from time to time as new technical information becomes available. The user has the responsibility to contact the company to make sure that the sheet is the latest one issued.

U. S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
MATERIAL SAFETY DATA SHEET

Form Approved
OMB No. 44-R1387

SECTION I

MANUFACTURER'S NAME Shipley Company Inc.		EMERGENCY TELEPHONE NO. (617) 969-5500
ADDRESS (Number, Street, City, State, and ZIP Code) 2300 Washington Street, Newton, Massachusetts 02162		
CHEMICAL NAME AND SYNONYMS n.a.		TRADE NAME AND SYNONYMS PREPOSIT[®] ETCH 746
CHEMICAL FAMILY n.a.	FORMULA Proprietary	

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS n.a.			BASE METAL n.a.		
CATALYST n.a.			ALLOYS n.a.		
VEHICLE n.a.			METALLIC COATINGS n.a.		
SOLVENTS n.a.			FILLER METAL PLUS COATING OR CORE FLUX n.a.		
ADDITIVES n.a.			OTHERS n.a.		
OTHERS n.a.					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Sulfuric Acid				50	1mg/M³

SECTION III PHYSICAL DATA

BOILING POINT (°F.) (>100°C)	> 212°F	SPECIFIC GRAVITY (H ₂ O=1)	~ 1.4
VAPOR PRESSURE (mm Hg.)	n.a.	PERCENT VOLATILE BY VOLUME (%) water based solution	n.a.
VAPOR DENSITY (AIR=1)	n.a.	EVAPORATION RATE (= 1)	n.a.
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR Orange liquid with slight, non-irritating odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Non-flammable	FLAMMABLE LIMITS	Lel n.a.	Uel n.a.
EXTINGUISHING MEDIA	Water, CO₂, Dry Chemical			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 1 mg/M³ - based on sulfuric acid

EFFECTS OF OVEREXPOSURE As for sulfuric acid

Note: The made-up ETCH 746 Bath also contains hydrogen peroxide.

EMERGENCY AND FIRST AID PROCEDURES

Swallowing: Contact physician immediately: Eye Contact: Flush with copious amounts of water - contact physician: Skin Contact: Flush with copious amounts of water;

Inhalation: Move to fresh air.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (Materials to avoid)

Organic materials, reducing agents

HAZARDOUS DECOMPOSITION PRODUCTS

When heated, may emit toxic fumes

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush area with cold water

WASTE DISPOSAL METHOD

Contact Shipley Product Service tment

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

n.a.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	

Local Exhaust Recommended

OTHER

PROTECTIVE GLOVES

Yes

EYE PROTECTION

Yes

OTHER PROTECTIVE EQUIPMENT

Suitable Protective Clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Treat as a solution of sulfuric acid. Store in a dry area, away from organic materials and reducing agents, at 50-90°F (10-32°C). Do not store in direct

sunlight. Keep sealed when not in use.

Note: The made-up ETCH 746 bath also contains hydrogen peroxide.

M A T E R I A L S A F E T Y D A T A S H E E T S

Shipley Company Inc.
2300 Washington Street
Newton, Massachusetts 02162
Emergency Phone: (617) 969-5500

EFFECTIVE DATE: 13 Mar. 1984

PRODUCT NAME: PRO™ BOND 80 A

Sodium Chlorite Solution DOT CLASS: Corrosive Material UN1908

SECTION I - HAZARDOUS MIXTURES

INGREDIENT (TYPICAL VALUES - NOT SPECIFICATIONS)	PERCENT	TLV
Sodium Chlorite	25	
Proprietary Ingredients	75	
Including Water, not deemed hazardous per OSHA definition.		

SECTION II - PHYSICAL DATA

BOILING POINT(°F): N.A.	SPECIFIC GRAVITY (H ₂ O=1): Approx. 1.25
VAPOR PRESSURE(mmHg): N.A.	% VOLATILE BY VOL.: Water based
VAPOR DENSITY(Air=1): N.A.	solution
SOLUBILITY IN WATER: Miscible	EVAPORATION RATE: N.A.
APPEARANCE AND ODOR: Clear water white to slightly yellow liquid.	

SECTION III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N.A.	FLAMMABLE LIMITS:
METHOD USED:	
EXTINGUISHING MEDIA: Water	
SPECIAL FIRE FIGHTING PROCEDURES: Use N10SH/MSHA approved self-contained breathing apparatus where this material is involved in fire.	
UNUSUAL FIRE AND EXPLOSION HAZARDS: None	

SECTION IV - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Heat, evaporation to dryness; dry material unstable @347°F
INCOMPATIBILITY: Readily oxidizable materials, acids.
HAZARDOUS DECOMPOSITION: Explosive chlorine dioxide gas on contact with acids.
HAZARDOUS POLYMERIZATION: Will not occur

M A T E R I A L S A F E T Y D A T A S H E E T
Shipley Company Inc., Newton, Massachusetts 02162
Emergency Phone: (617) 969-5500
PRO™ BOND 80 A

SECTION V - SPILL, LEAK AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS: Remove all sources of ignition. Wear approved self-contained breathing apparatus. Clean-up in a manner to minimize contamination with organic material. Do not return to original container.

DISPOSAL METHOD: Place in a fresh container and isolate outside, well ventilated. Do not seal the container. Flush any residual material with large quantities of water.

SECTION VI - HEALTH HAZARD DATA

INGESTION: Drink large quantities of water--contact Physician immediately

EYE CONTACT: Flush with water for 15 minutes--contact physician

SKIN CONTACT: Flush with copious amounts of water--contact physician

INHALATION: Move to fresh air; if breathing is labored, contact physician

EFFECT OF OVEREXPOSURE: Irritation or burns to skin, eyes and mucous membrane.

SECTION VII - SPECIAL PROTECTION INFORMATION

VENTILATION: Required where exposure to mist.

RESPIRATORY PROTECTION: N.A.

PROTECTIVE CLOTHING: Neoprene gloves and suitable protective clothing

EYE PROTECTION: Chemical goggles

SECTION VIII - SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Protect from direct sunlight and fire. Store in a cool dry place. Do not store together with acids, sulfur, sulfur compounds, fats and fatty oils, other flammable materials or easily oxidizable material.

N.A. denotes non-applicable

The Information and recommendations contained herein are believed to be accurate. However, no guarantee or warranty, expressed or implied, is given.

M A T E R I A L S A F E T Y D A T A S H E E T S

Shipley Company Inc.
2300 Washington Street
Newton, Massachusetts 02162
Emergency Phone: (617) 969-5500

EFFECTIVE DATE: 21 Mar. 1984

PRODUCT NAME: PRO[™] BOND 80 B

Sodium Hydroxide Solution DOT CLASS: Corrosive Material UN1824

SECTION I - HAZARDOUS MIXTURES

INGREDIENT (TYPICAL VALUES - NOT SPECIFICATIONS)	PERCENT	TLV
Sodium Hydroxide	10	2mg/M ³
Proprietary Ingredients	90	

Including Water, not deemed hazardous per OSHA definition.

SECTION II - PHYSICAL DATA

BOILING POINT(°F): N.A.	SPECIFIC GRAVITY (H ₂ O=1): Approx. 1.2
VAPOR PRESSURE(mmHg): N.A.	% VOLATILE BY VOL.: Water based solution
VAPOR DENSITY(Air=1): N.A.	EVAPORATION RATE: N.A.
SOLUBILITY IN WATER: Complete	
APPEARANCE AND ODOR: Water white with a slight non-irritating odor.	

SECTION III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Non-flammable	FLAMMABLE LIMITS:
METHOD USED:	
EXTINGUISHING MEDIA: Water, CO ₂ , dry chemical	
SPECIAL FIRE FIGHTING PROCEDURES: None	
UNUSUAL FIRE AND EXPLOSION HAZARDS: None	

SECTION IV - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID:
INCOMPATIBILITY: Acids
HAZARDOUS DECOMPOSITION: May produce heat upon neutralization
HAZARDOUS POLYMERIZATION: Will not occur

M A T E R I A L S A F E T Y D A T A S H E E T
Shipley Company Inc., Newton, Massachusetts 02162
Emergency Phone: (617) 969-5500
PRO™ BOND 80 B

SECTION V - SPILL, LEAK AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS: Flush area with cold water into Waste Treatment System.
DISPOSAL METHOD: Contact Shipley Technical Services Department

SECTION VI - HEALTH HAZARD DATA

INGESTION: Drink large quantities of water--contact Physician
EYE CONTACT: Flush with water for 15 minutes--contact physician immediately
SKIN CONTACT: Flush with copious amounts of water
INHALATION: Move to fresh air
EFFECT OF OVEREXPOSURE: Irritation or burns to skin, eyes and mucous membrane, respiratory and gastrointestinal tracts

SECTION VII - SPECIAL PROTECTION INFORMATION

VENTILATION: Room exhaust
RESPIRATORY PROTECTION: Not normally required.
PROTECTIVE CLOTHING: Chemical gloves and suitable protective clothing
EYE PROTECTION: Chemical goggles

SECTION VIII - SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in a cool dry place between 50-90°F. Do not store in direct sunlight. Keep container closed when not in use.

N.A. denotes non-applicable

The Information and recommendations contained herein are believed to be accurate. However, no guarantee or warranty, expressed or implied, is given.

Chemelex

A DIVISION OF RBP CHEMICAL CORPORATION

812 8064 0000 1

1-800-558-0747

MATERIAL SAFETY DATA SHEET

I. PRODUCT INFORMATION

Product Name: ~~Rinse-Aide-90~~

Generic Description: (Alkaline Cleaner/Residue Remover)

Precautionary Labeling:

DANGER! Causes burns. Harmful if inhaled or absorbed through skin. CAUTION! Combustible. Do not get in eyes, on skin, or on clothing. Do not breathe mist. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Keep away from heat and open flame. First Aid: In case of contact, immediately flush eyes and skin with water for at least 15 minutes, while removing contaminated clothing. Call a physician.

D.O.T.
Name
Corrosive Liquid NOS
UN 1760

D.O.T. Hazard
Classification
Corrosive Liquid

Flash
Point
145°F

II. HAZARDOUS INGREDIENTS AND ASSOCIATED EFFECTS

2-BUTOXYETHANOL: (SYN: Butyl Cellosolve) (C.A.S. #111-76-2) (TLV=25ppm) (F.Pt. 143°F) (LD50 Oral-rat 1480mg/kg) (LD50 skin-rbt 490mb/kg) (LC50 inh-mus 700ppm/7H) Can be absorbed through skin and result in chronic poisoning. Slow evaporation rate results in low inhalation hazard. Excessive exposures may cause changes in blood cells and damage to kidneys. Lungs and liver may also be affected. Causes irritation to eyes. Formula percentage = 10%.

NOTE: HAZARDOUS INGREDIENTS MAY BE CONTINUED ON BACK.

HAZARDOUS INGREDIENTS (CONTINUED)

NITRILOTRIACETIC ACID: (SYN: NTA) (Status: Carcinogenesis bioassay completed; results positive: mouse, rat) (oral-rat LD50 1470mg/kg) Based on tests with laboratory rats and mice, the National Toxicology Program has listed NTA as a suspect carcinogen. According to the American Conference of Governmental Industrial Hygienists (ACGIH) guidelines, "NTA would not be considered an occupational carcinogen of any practical significance." There is no evidence that NTA is a human carcinogen. Dow Chemical Company, after critical review of NTA as a carcinogen, did not feel it was appropriate to put a carcinogen label on their products containing small amounts of NTA. Formula percentage = <2%.

ETHANOLAMINE: (SYN: Monoethanolamine) (C.A.S. # 141-43-5) (TLV=3ppm) (F.Pt. 204°F) (eye-rbt 763ug SEV) (LD50 skn-rbt 1000mg/kg) (LD50 oral-rat 2100mg/kg) (D.O.T. = Corrosive) Excessive exposure may cause narcosis. Extremely irritating to eyes and may cause permanent eye injury. Corrosive to skin and expected to cause severe skin damage with burns and blistering. Concentration of 50-100 ppm over 1-3 months have caused liver and kidney damage and lung inflammation. Formula percentage = <70%.

III. EMERGENCY AND FIRST AID PROCEDURES:

Eyes: Flush eyes with plenty of water for at least 15 minutes. Call a physician
Skin: Flush skin with plenty of water for at least 15 minutes. Call a physician
Inhalation: Remove to fresh air. Call a physician if symptoms persist.
Ingestion: Dilute by drinking large amounts of water. Call a physician immediately.

IV. SPECIAL PROTECTION INFORMATION:

Protective Gloves: Plastic (PVC) or Rubber
Respiratory Protection: Air purifying respirator at low concentrations or self-contained breathing apparatus at moderate/high concentrations.

Eye Protection: Chemical goggles
Other: Eye bath and safety shower

Ventilation:
Local Exhaust _____ Mechanical X Special _____

V. PHYSICAL DATA

Boiling Point: Not established Solubility in Water: Complete
Specific Gravity: 1.012 Appearance and Odor: Colorless liquid
% Volatiles (by Vol.): 26.7 with slight ammonical odor

VI. FIRE AND EXPLOSION HAZARD DATA

Flash Point: 145°F (TCC)
Extinguishing Media: CO₂, water fog, dry chemical, or universal type foam.
Special Fire Fighting Procedures: Use self-contained breathing apparatus at fire condition
Unusual Fire and Explosion Hazards: Burning can produce nitrogen oxides.

VII. REACTIVITY DATA

Stability: Stable X Unstable _____
Conditions to Avoid: Heat
Incompatibility: Strong acids or strong oxidizing agents.
Hazardous Decomposition Products: Nitrogen oxides will be produced at fire conditions.

VIII. SPECIAL HANDLING AND STORAGE CONDITIONS

Store in cool place. Avoid contact with eyes and skin. Avoid breathing vapor.

IX. SPILL, LEAK, AND DISPOSAL TECHNIQUES

Steps to be taken if the material is released or spilled.	Small spills: neutralize and flush to sewer with water according to local regulations. Large spills: absorb and incinerate or dike spill and pump to salvage tank for disposal.
Waste Disposal Techniques	Neutralize with dilute acid and dispose of in accordance with local, state and federal regulations.

Prepared by Charles Dixon Date Oct 28, 1985

NOTE: The information contained herein is furnished without warranty of any kind. Users should consider this data a supplement to other information gathered by them and are responsible for completeness of information to assure proper use of these materials and the safety and health of their employees and customers.



DuPont Electronics

The DuPont Company
715 Chestnut Run
Wilmington, Delaware 19898

bcc: Allen Wood & Assoc

April 20, 1988

ALLEN WOODS & ASSOCIATES
1285 RAND RD
DES PLAINES, IL 60016

This is in follow up to our phone conversation of April 19, 1988, concerning your request for a Material Safety Data Sheet for Riston® 1200 series photopolymer film resist. Since these films are articles under the definitions of the federal and state hazard communication standards no Material Safety Data Sheet is required. Enclosed please find a safe handling guide for these materials. An updated handling guide is in preparation and should be available in the near future.

An analysis of the volatiles liberated at normal laminating temperatures is enclosed.

Please feel free to contact me if you have any questions on this matter.

Sincerely,

Peter S. Strilko
Division Coordinator
Health and Environmental Affairs
(302) 999-5162

PSS/dm
A:014



RISTON*

PHOTOPOLYMER FILM RESIST
IMAGE TRANSFER SYSTEMS

TECHNICAL INFORMATION BULLETIN R-127

Storage Conditions for Riston® Photopolymer Film

RISTON Photopolymer Films are complex photosensitive systems designed to polymerize and harden when exposed to ultraviolet light. These products are carefully formulated to provide aging stability; however, like all photosensitive materials, they exhibit some sensitivity to heat. Prolonged exposure to excessive heat will also harden the film. Adverse affects to end-use performance include reduced adhesion and incomplete development.

First-in, first-out inventory control is recommended because it reduces the opportunity for overaging in storage. Stability of photopolymer films is enhanced by storing the unopened original package under the following conditions:

Temperature	5 - 21°C (40 - 70°F);
Relative Humidity	50 ± 20%

Temperature control is the more important and, within the range, a lower temperature is better. Before using, the film should be equilibrated to the process area environment [$21 \pm 3^\circ\text{C}$ ($70 \pm 5^\circ\text{F}$) and $50 \pm 10\%$ relative humidity recommended].

RISTON Photopolymer Film should not be automatically discarded if storage conditions have deviated from these recommendations. In fact, brief exposure to higher temperature during transport and temporary storage is normal. If storage outside the recommended limits occurs, examine the film for chemical and physical changes, and run a practical test before committing the film to production.

Prepared by C. D. Kaiser
Revised by R. H. Wopschall

E. I. DU PONT DE NEMOURS & CO. (INC.) • PHOTOSYSTEMS AND ELECTRONIC PRODUCTS DEPARTMENT
RISTON® PRODUCTS DIVISION • WILMINGTON, DE 19898

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*Reg. U.S. Pat. & Tm. off. for Du Pont's photopolymer film resists and associated processing equipment and solutions.

Riston® is made only by Du Pont.

DuPont Electronics





RISTON^{*}

TECHNICAL DATA

STORAGE OF RISTON® FILMS

RISTON® Photopolymer film resists are complex chemical systems designed to be sensitive to ultraviolet radiation. It is important that these products be stable for long periods under practical storage conditions. RISTON® films are carefully formulated to provide stability on aging. However, like all photosensitive materials, RISTON® exhibits some sensitivity to other forms of energy, such as mechanical pressure and heat, which may adversely affect its end use performance. RISTON® films are manufactured, packaged, and stored by Du Pont under carefully controlled conditions to protect the product. Care in storage and handling of RISTON® films by customers will assure that product remains fully functional for a period of many months.

Du Pont recommends a first-in, first-out inventory control system, thereby reducing the chances for RISTON® films becoming overaged in customers' storage. Du Pont's production and extensive distribution facilities have been established to allow customers to operate without excessive inventories.

Du Pont recommends that RISTON® films be stored in the unopened original package within these conditions:

Temperature (°F)	30-80
Humidity (%RH)	20-80

RISTON® should not be automatically discarded if your storage has deviated from these limits. While the foregoing summarizes our experience with RISTON®, we recommend that a film which has been stored outside these limits be examined for chemical and physical changes and a practical test run before it is committed to production.

Post-It™ brand fax transmittal memo 7671		# of pages >
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Cc:		Cc: VWR
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Fax # 708-979-3689		Fax # 708-879-8678



IM SCIENCE

Cherry Hill, N.J. 08034-0396, Phone (609) 354-9200

MATERIAL SAFETY DATA SHEET

Essentially Similar to U.S. Department of Labor Form OSHA-20

SECTION 1**NAME & PRODUCT**Chemical Name:
Pumice StoneCatalog Number:
PX1975 PX1980Trade Name & Synonyms:
NoneChemical Family:
Oxides**Formula:**67 - 75% SiO₂ 10 - 20% Al₂O₃ small amounts Na₂O, K₂O, CaOFormula Weight:
Indefinite**SECTION 2****PHYSICAL DATA**

Boiling Point, 760 mm Hg (°C)	N/A	Specific Gravity (H ₂ O = 1)	unavail
Melting Point (°C)	N/A	Solubility in H ₂ O, % by wt. at 20°C	Insoluble
Vapor Pressure at 20°C	N/A	Appearance and Odor PX1975: gray granules	
Vapor Density (air = 1)	N/A	PX1980: gray powder	
Percent Volatiles by Volume	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

SECTION 3**FIRE AND EXPLOSION HAZARD DATA**

Flash Point (test method)	None	Flammable Limits	Lel	N/A	Uel	N/A
Extinguishing Media	N/A					

Special Hazards and Procedures Wear self-contained breathing apparatus

Unusual Fire and Explosion Hazards None

SECTION 4**REACTIVITY DATA**

Stable	X	Conditions to Avoid
Unstable		None

Materials to Avoid None

() Water () Acids () Bases () Corrosives () Oxidizers
 () Other (specify)

Hazardous Decomposition Products None

SECTION 5**SPILL OR LEAK PROCEDURES AND DISPOSAL**

Steps to be Taken in Case Material is Released or Spilled Take up & containerize for proper disposal

Waste Disposal Method To be performed in compliance with all current local, state and federal regulations

The statements contained herein are offered for informational purposes only and are intended to be followed only by persons having related technical skills and at their own discretion and risk. Since conditions and manner of use are outside our control, we make no warranties with any use of this information.

PX1975, PX1980

SECTION 6

HEALTH HAZARD DATA

Threshold Limit Value

None Established

Effects of Overexposure

Prolonged or repeated breathing of dust causes silicosis, lung damage

First Aid Procedures

GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE

Eyes:

Inhalation:

Flush thoroughly with water
Remove to fresh air

SECTION 7

SPECIAL PROTECTION INFORMATION

Ventilation, Respiratory Protection, Protective Clothing, Eye Protection

Provide adequate general mechanical and local exhaust ventilation
Protect eyes and skin with safety goggles and gloves

Wear dust respirator if dust concentration is heavy

Do not breathe dust

Do not get in eyes

SECTION 8

SPECIAL HANDLING AND STORING PRECAUTIONS

Keep container closed when not in use

Store at controlled room temperature

Wash thoroughly after handling

DOT - Not Regulated

SECTION 9

HAZARDOUS INGREDIENTS

(refer to section 3 through 8)

N/A

SECTION 10

OTHER INFORMATION

one

EMERGENCY PHONE NUMBER (800) 423-8300

AUTHORIZED SIGNATURE

DATE ISSUED: 6/84

DATE REVISED:



RISTON*

TECHNICAL DATA

MATERIAL SAFETY DATA SHEET

4882

SECTION I	
MANUFACTURER'S NAME E. I. du Pont de Nemours & Company (Inc.)	EMERGENCY TELEPHONE NO. (201) 257-4600 Ext. 533 or 332
ADDRESS (Number, Street, City, State, and ZIP Code) 1007 Market St., Wilmington, DE 19898	
CHEMICAL NAME AND SYNONYMS Photopolymer film resist	TRADE NAME AND SYNONYMS RISTON (all types)
CHEMICAL FAMILY Photosensitive thermoplastic polymer	FORMULA Acrylic resins and monomers with plasticizers & photo-initiators

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (units)	ALLOYS AND METALLIC COATINGS	%	TLV (units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS	Unexposed resist contains acrylic monomers which are skin irritants	10-50	not appl.		
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (units)

SECTION III PHYSICAL DATA		Not applicable. See Appendix Section III	
BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O = 1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VALUE DENSITY (AIR = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR			

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (method used) Not applicable	FLAMMABLE LIMITS See Appendix Section IV	Lel	Uel
EXTINGUISHING MEDIA Water, CO ₂ , Foam or Dry Chemical			
SPECIAL FIRE FIGHTING PROCEDURES None			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

NOTICE FROM DU PONT

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

SECTION V HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	Not applicable
EFFECTS OF OVEREXPOSURE	See Appendix Section V
EMERGENCY AND FIRST AID PROCEDURES	See Appendix Section V

SECTION VI REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID None
	STABLE	X	
INCOMPATIBILITY (Materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS None			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID None
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Not applicable
WASTE DISPOSAL METHOD	See Appendix Section VII

SECTION VIII SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify type)			
VENTILATION Good room ventilation required	LOCAL EXHAUST	Recommended at laminator; required for developing and stripping	SPECIAL None
	MECHANICAL (General)		OTHER None
PROTECTIVE GLOVES	Recommended for handling unexposed resist		EYE PROTECTION Suggested to protect against liquid splashes
OTHER PROTECTIVE EQUIPMENT None			

SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	None other than for preservation of the product
OTHER PRECAUTIONS	See Appendix Section IX

APPENDIX

MATERIAL SAFETY DATA SHEET

SECTION III—PRODUCT DESCRIPTION

In structure, RISTON® is a three-layer sandwich of MYLAR® polyester film, the photoresist, and a polyolefin separator sheet. In use, the separator sheet is removed and the photoresist laminated to a cleaned copper-clad panel. Laminating temperatures range from 200 to 250° F.

SECTION IV—FLAMMABILITY

RISTON® supports combustion but is not highly flammable. A single sheet with large surface area exposed to air will burn readily when ignited; a roll of film burns slowly and melts.

The products of *complete* combustion are carbon dioxide and water. As with many similar combustible, nonexplosive organic materials, RISTON® will burn with the generation of considerable quantities of carbon monoxide and smoke. Avoiding smoke inhalation should be a major consideration in a fire involving RISTON® or similar materials.

SECTION V—EFFECTS OF OVEREXPOSURE

Effects of Overexposure:

Ingestion—The film is classified as slightly toxic. Nausea and some gastric discomfort may occur but no serious effects are expected.

Skin Contact—The unexposed film is a mild irritant. Spent developer solutions containing the dissolved unexposed resist and condensate from vapors at the laminator are also irritants. Temporary skin reddening, slight swelling, and small blisters may occur. The symptoms are similar to poison ivy rash.

Inhalation—Vapors from lamination may be irritating to respiratory membranes and to the eyes. However, there has been no report of any cumulative toxic effects.

Emergency and First Aid Procedures:

Ingestion—Consult a physician.

Skin Contact—After contact with the unexposed film, developer solutions containing the dissolved unexposed film, or condensate from the laminator, the skin must be washed promptly with soap and water. Consult a physician if skin irritation develops.

Inhalation—Consult a physician if toxic symptoms occur.

SECTION VII—WASTE DISPOSAL PROCEDURES

In the process of using RISTON®, the cover sheets of polyolefin film and MYLAR® polyester film are discarded. These cover sheets, which have been in contact with the unexposed resist, may contain trace amounts of irritants and should not be reused. Use lined trash cans and dispose of the used cover sheets in the liner to minimize handling.

SECTION IX—OTHER PRECAUTIONS

Personnel should be thoroughly schooled in proper handling procedures. In evaluating and controlling exposures arising from the use of photoresist, dermatitis is the primary consideration, but eye irritation and even the possibility of respiratory membrane and lung irritation should be considered. Vapors and fumes should be controlled by engineering methods, and direct skin contact with suspected irritants should be avoided.

One class of RISTON® photopolymer film resists is designed for developing in 1,1,1-trichloroethane (methyl chloroform) and stripping in methylene chloride (dichloromethane). Consult the supplier of these solvents for information on their safe handling.

Another class of RISTON® film resists—RISTON® II—is designed for developing and stripping in proprietary aqueous-base solutions.



RISTON*

TECHNICAL DATA

RISTON* DEVELOPER 2000

Developer 2000 is intended for the development of Du Pont RISTON Series-200R aqueous processable dry film photoresists such as 210R, 215R, 218R, and RISTON Type 525 Phototape.

Developer 2000 solution is prepared from two separate concentrates. Part A, an organic liquid concentrate, provides selective developing action to allow removal of unexposed resist with a minimum effect on exposed resist. Part B, a white powder, controls the pH of the developing solution. Proper control of Developer 2000 allows good development latitude (2-3X) and high developing capacity.

SOLUTION MAKE-UP

The dilute developer is only mildly alkaline and accidental contact should not result in skin burns. When mixing the solutions, however, goggles and rubber gloves should be worn.

The vapors from Developer 2000 are not considered to be hazardous provided there is adequate venting of equipment, but breathing chemicals is to be avoided as a general precaution.

Mixing can be performed in any suitable clean container (plastic, polyethylene, polypropylene, PVC, glass, stainless steel, etc.). The solution is mildly alkaline and any metal container such as aluminum which might be attached should be avoided.

Procedure

- Prepare 170-340 liter (45-90 gallon) batch of 8:1 working strength Developer 2000 in the developer unit.
- Adjust the temperature controls to $29.0^{\circ} \pm 3^{\circ}\text{C}$ ($85^{\circ} \pm 5^{\circ}\text{F}$).

To make up to 170 liters (45 gallons):

- COMPLETELY dissolve the powder (Part B) in 35-55 liters (10-15 gallons) of hot 65°C (150°F) water with stirring.
- Add warm water until the total volume is 151 liters (40 gallons).
- Add the liquid concentrate (Part A) to obtain full 170 liters (45 gallons).

This is now the 8:1 working strength Developer 2000 solution.

It is recommended that the entire contents of an 18.9-liter (5-gallon) cubitainer be made up into solution at one time in a large stock container. Small volumes 19-26 liters (5-7 gallons) used in an A-24 Processor, may then be drawn from this stock container.

If smaller quantities must be handled, the following ratios must be observed:

Part B 33 gm/3.8 liters (1.17 dry oz/gal)

Part A 420 ml/3.8 liters (14.2 liquid oz/gal)

Preparing 8:1 Working Strength Solution

Developer 2000 is provided as a two-part concentrate (in 18.9-liter [5-gallon] cubitainers) consisting of a liquid and a dry powder. The entire contents (Parts A&B) of this cubitainer will make 170 liters (45 gallons) of working strength Developer 2000 solution.

Converting Other Processors (Etchers, etc.)

1. Thoroughly clean unit to remove all residues. Consult your RISTON* Technical Representative for more specific recommendations.
2. If no filters are present, install 25 μ (1 mil) cotton or "Dynel" on the discharge side of the pump.

DETERMINING DEVELOPMENT TIME

Development guidelines given in the photoresist data sheets are based on the Developer 2000 working strength developer (8:1) being at $29^{\circ}\pm 3^{\circ}\text{C}$ ($85^{\circ}\pm 5^{\circ}\text{F}$) and spray pressures of 0.7-2.1 kg/cm² (10-30 psig) in the ADS-24. Temperatures below the recommended $29^{\circ}\pm 3^{\circ}\text{C}$ ($85^{\circ}\pm 5^{\circ}\text{F}$) will result in longer developing times (approximately 30-40% more at 21°C [70°F]). Higher temperatures will result in faster development times and reduced development latitude of the photoresist as well as premature loss of the active ingredients in the developer solution.

Development times for conveyorized equipment such as ADS-24 and converted etchers are determined by taking a typical production panel through cleaning of the copper surface and lamination of the resist. The conveyor speed of the developing unit should be adjusted so that the unexposed resist is removed completely in the first $\frac{1}{3}$ to $\frac{1}{2}$ the length of the developing chamber. It is convenient to place a piece of tape on the lid or side of the developing point. As the development rate slows down with increasing resist loading in the developer, the conveyor speed can be slowed to bring the clean development point back to the tape reference point.

Development times for A-24 Processors are determined by taking a typical production panel through copper cleaning and resist lamination. The time to clean (T_c) is then measured in the A-24 as the time in seconds needed to completely develop off the unexposed resist. Development time is $2 \times T_c$.

The actual development time will change with increasing resist loadings in the developer solution. The development times should be increased based on resist loadings; daily checks based on usage should be made to determine the proper development times.

In all development systems, care must be taken to avoid drying of the developing solution on boards. Thorough water rinsing immediately after the development chamber is recommended to eliminate the potential of dissolved resist residues drying on the boards.

Continuous Replenishment

Using continuous replenishment will allow a steady development system. With the conveyor speed staying constant, the resist-coated panels should be completely developed at the same point in the development chamber. Fresh 8:1 Developer 2000 from a large stock container is fed at a rate which is dependent on the amount of resist that is being developed per hour. An equal volume of used Developer 2000 is removed via an overflow tube to the drain.

Periodic checks of the spray pressure gauges should be made to ascertain that the spray pressures are greater than 0.7-0.85 kg/cm² (10-12 psig). A filter change or cleaning may be necessary to increase the spray pressures.

PREPARING EQUIPMENT FOR AQUEOUS PROCESSING

In preparing a RISTON* Processor previously used with solvent-processable resists for use with aqueous-processable resists, it is most important that all solvents be removed from the equipment before introducing Developer 2000 solution.

Procedure

1. Completely drain solvent from all chambers.
2. Remove and discard filters. Drain all pump housings.
3. Replace filter housing, but do not replace filters at this time.
4. Continually flush chambers with water and run sprays until no droplets of solvent are observed in bottom of unit. Caution: do not run pumps dry.
5. Drain all water and swab chambers dry.
6. Install new filter – 25 μ (1 mil) cotton or “Dynel” such as CUNO Model 1B1.
7. Charge machine with 8:1 RISTON Developer 2000 solution.
8. Control temperature at 29° \pm 3°C (85° \pm 5°F).

- Adjust the conveyor speed until a typical resist-coated panel develops cleanly in the first $\frac{1}{3}$ to $\frac{1}{2}$ of the developing chamber.
- Develop resist-coated panels until approximately 10 m² (100 ft²) of unexposed resist has been removed.
- Determine the area of unexposed resist removed by development in one hour of continuous operation. Note: Typical pattern plating images result in 25-30% of the resist being removed; typical etching images result in 70-75% of the resist being removed.

Example: 30.5 cm x 45.7 cm (18 in x 12 in) panel, double-sided, pattern plating pattern, plating area 837 cm² (130 in²); each panel has 0.0837 m² (0.9 ft²) removed/panel. If 200 panels/hour are processed, the total resist removed is:

$$\begin{aligned} 200 \text{ panels/hr} \times 0.0837 \text{ m}^2 &= 16.74 \text{ m}^2/\text{hr} \\ \text{or } 0.9 \text{ ft}^2 &= 180 \text{ ft}^2/\text{hr} \end{aligned}$$

- Calculate (in appropriate units) the replenishment rate necessary to obtain a resist loading of approximately 0.61 m²/l (25 ft²/gal) by the following formula:

For 25 μ (1 mil) resist thickness

Replenishment rate 1/hr (gal/hr)

$$\begin{aligned} &= \frac{\text{m}^2 \text{ resist/hr} \quad (\text{ft}^2 \text{ resist/hr})}{0.61 \text{ m}^2/\text{l} \quad (25 \text{ ft}^2/\text{gal})} \\ &= \frac{16.74 \text{ m}^2/\text{hr} \quad (180 \text{ ft}^2/\text{hr})}{0.61 \text{ m}^2/\text{l} \quad (25 \text{ ft}^2/\text{gal})} \\ &= 27.5 \text{ l/hr} \quad (7.2 \text{ gal/hr}) \end{aligned}$$

FOAM CONTROL

As the amount of resist in the developing solution increases, foaming may occur. Foaming can be controlled by the addition of 0.1-0.25 ml/l (0.5-1.0 ml/gal) of RISTON* Antifoam 200 or equivalent to the developing solution in the processor.

SAFE HANDLING INFORMATION RISTON DEVELOPER 2000 CONCENTRATE

WARNING! HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CAUSES EYE AND SKIN IRRITATION. COMBUSTIBLE. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR OR MIST. KEEP CONTAINER CLOSED. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. KEEP AWAY FROM HEAT AND OPEN FLAME.

Wear rubber gloves, apron, and safety glasses or goggles when mixing or handling the developer. If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water. Wash clothing before re-use.

DISPOSAL AND ECOLOGICAL CONSIDERATIONS

RISTON Developer 2000 was tailored to be compatible with municipal waste treatment systems. Studies have shown that the chemicals in this aqueous solution have little impact on the activity or efficiency of municipal or regional sewage systems. Therefore, effluents containing only spent RISTON solutions are usually not subject to pretreatment under current EPA and local standards. However, consult state and local regulations for requirements in your area. Should you determine that treatment is necessary, your RISTON Technical Representative can provide the effluent parameters for spent solutions and a brochure describing a method and equipment capable of treating all RISTON Series-200R developing and stripping solutions.

XXSODIUM ACETATEXX

MAY

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XXSODIUM ACETATEXX

MATERIAL SAFETY DATA SHEET

2582

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 127-09-3

SUBSTANCE: XXSODIUM ACETATEXX

TRADE NAMES/SYNONYMS: (ANHYDROUS SODIUM ACETATE; SODIUM ACETATE, TRIHYDRATE;
S-207; S-209; S-210; S-220; S-608)

CHEMICAL FAMILY:
ORGANIC SALT

MOLECULAR FORMULA: C2-H3-NA-02 MOL WT: 82.04

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: SODIUM ACETATE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: WHITE, HYGROSCOPIC POWDER MELTING POINT: 615 F (324 C)

SPECIFIC GRAVITY: 1.5 SOLUBILITY IN WATER: 120% (TRIHYDRATE)

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT HAZARD IN DUST FORM WHEN EXPOSED TO HEAT OR FLAME.

FINELY DISPERSED PARTICLES ARE EXPLOSIVE.

FLASH POINT: 1125 F (607 C) AUTOIGNITION TEMP.: 1132 F (611 C)

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

500 MG/24 HOURS SKIN-RABBIT MILD IRRITATION; 10 MG EYE-RABBIT MILD IRRITATION;
6891 MG/KG ORAL-MOUSE LD50; 3530 MG/KG ORAL-RAT LD50; 335 MG/KG INTRAVENOUS-
MOUSE LD50; CARCINOGEN STATUS: NONE.
SODIUM ACETATE MAY IRRITATE THE EYES, SKIN, AND MUCOUS MEMBRANE, AND IS
MODERATELY TOXIC BY INGESTION.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.

ACUTE EXPOSURE- MAY CAUSE RESPIRATORY IRRITATION, COUGH, DYSPNEA, AND RESP-
IRATORY DISTRESS.

CHRONIC EXPOSURE- MAY CAUSE MUCOUS MEMBRANE IRRITATION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND
AT REST. GET MEDICAL ATTENTION.

—SKIN CONTACT:
IRRITANT.

ACUTE EXPOSURE- MAY CAUSE IRRITATION AND PAIN.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION.

EYE CONTACT:

IRRITANT.

ACUTE EXPOSURE- CONTACT MAY CAUSE REDNESS, PAIN, AND IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:

MODERATELY TOXIC.

ACUTE EXPOSURE- MAY CAUSE NAUSEA, SORE THROAT, COUGHING, AND ABDOMINAL PAIN.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

REACTION WITH DIKETENE MAY CAUSE VIOLENT POLYMERIZATION.
MAY FORM EXPLOSIVE MIXTURE WITH POTASSIUM NITRATE.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE ACRID SMOKE AND IRRITATING FUMES.

POLYMERIZATION:

NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. PREVENT DISPERSION OF DUST IN THE ATMOSPHERE. PROTECT CONTAINER FROM PHYSICAL DAMAGE. DO NOT STORE WITH INCOMPATIBLE SUBSTANCES.

SPILL AND LEAK PROCEDURES

—OCCUPATIONAL SPILL:

WITH A CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS AWAY FROM SPILL AREA.

PROTECTIVE EQUIPMENT

VENTILATION:

—PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
HIGH LEVELS- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE
OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT
REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS
SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO
THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE
IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/14/85 REVISION DATE: 04/23/85

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****SODIUM BICARBONATE****

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OCT 1986

MATERIAL SAFETY DATA SHEET

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1 REAGENT LANE
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(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 09/23/86
PO NBR: N/A
ACCT: 001264-06
INDEX: 04-8626-10752
CAT NO: S6313

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 144-55-8

SUBSTANCE: ****SODIUM BICARBONATE****

TRADE NAMES/SYNONYMS: SODIUM BICARBONATE (1:1); MONOSODIUM CARBONATE; SODIUM HYDROGEN CARBONATE; SODIUM ACID CARBONATE; BICARBONATE OF SODA; BAKING SODA; CARBONIC ACID, MONOSODIUM SALT; COL-EVAC; JUSONIN; NEUT; SODA MINT; S-233; S-631

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: C-H-NA-O3 MOL WT: 84.00

CERCLA RATINGS (SCALE 0-3): HEALTH=1 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: SODIUM BICARBONATE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: WHITE CRYSTALLINE POWDER OR GRANULES

MELTING POINT: 518 F (270 C) SPECIFIC GRAVITY: 2.2

PH: (0.1 MOLAR SOL.) 8.3 SOLUBILITY IN WATER: 6.9% @ 0 C

SOLVENT SOLUBILITY: INSOLUBLE IN ALCOHOL

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

30 MG/3 DAYS INTERMITTENT SKIN-HUMAN MILD IRRITATION; 1260 MG/KG ORAL-INFANT
TDLO; 4220 MG/KG ORAL-RAT LD50; CARCINOGEN STATUS: NONE.
SODIUM BICARBONATE IS A MILD EYE, SKIN, AND MUCOUS MEMBRANE IRRITANT. IT MAY
CAUSE ALKALOSIS IN DOSES OVER 5 GM/KG. ALKALOSIS MAY ALSO OCCUR FROM SKIN
APPLICATION.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.

ACUTE EXPOSURE- MAY CAUSE COUGH, AND MILD RESPIRATORY IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE SLIGHT MUCOUS
MEMBRANE IRRITATION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT
REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT.

ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION. PROLONGED CONTACT MAY CAUSE
BURNS. MAY BE ABSORBED PRODUCING SYMPTOMS SIMILAR TO THOSE OF INGESTION.

CHONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). MAINTAIN RESP-
IRATION AND GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
IRRITANT.

ACUTE EXPOSURE- MAY CAUSE MILD IRRITATION AND REDNESS.

CHRONIC EXPOSURE- PROLONGED CONTACT WITH VAPORS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:
MILDLY TOXIC.

ACUTE EXPOSURE- MAY CAUSE HEADACHE, NAUSEA, AND ABDOMINAL PAIN.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

DECOMPOSES SLOWLY IN MOIST AIR.

INCOMPATIBILITIES:
MAY REACT VIOLENTLY WITH STRONG ACIDS.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE ACRID SMOKE AND IRRITATING FUMES.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. PREVENT DISPERSION OF DUST IN THE ATMOSPHERE. PROTECT CONTAINER FROM PHYSICAL DAMAGE. DO NOT STORE WITH INCOMPATIBLE SUBSTANCES.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
WITH A CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS AWAY FROM SPILL AREA.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
HIGH LEVELS- HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH FULL FACEPIECE.

**FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE
OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.**

CLOTHING:
**EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT
REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.**

GLOVES:
PROTECTIVE GLOVES ARE NOT REQUIRED BUT RECOMMENDED.

EYE PROTECTION:
**EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE.**

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/14/85 **REVISION DATE: 04/23/85**

-ADDITIONAL INFORMATION-
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THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SODIUM BICARB USP POWD 1 100#
PRODUCT CODE: 16-10930-02

DATE: 06/20/88 PAGE 01

CAS # 000144-55-8

FORMULA: NaHCO_3

CHEMICAL FAMILY: Carbonates

CHEMICAL NAME AND SYNONYMS: (Sodium Bicarbonate; Carbonic Acid Mono-sodium Salt; Baking Soda; Better Blend Soda; Sodium Bicarbonate USP, Food Grade & Feed Grade; Freestyle Alkalinity Plus)

SUPPLIERS NAME: Thompson-Hayward Chemical Company

5200 Speaker Rd
Kansas City

Ks 66106

SUPPLIERS PHONE NUMBER: 913-321-3131

TRANSPORTATION EMERGENCY PHONE NUMBER: 1-800-424-9300

SECTION I Hazardous Ingredients

Ingredient	Percent	TLV
SODIUM BICARBONATE	Approx 100	NUISANCE DUSTS PEL/TWA 8Hr 15 mg/m(3) Total Dust PEL/TWA 8Hr 5 mg/m(3) Respirable Dust - OSHA TLV/TWA 8Hr 10 mg/m(3) Total Dust ACGIH

SECTION II Health Hazards

Threshold Limit Value: As indicated - Section I.

Potential Effects of Exposure (listed by primary routes of entry)

Eyes: Mild irritant.

Skin: May cause irritation from long contact, or if skin broken or abraded. Irritant - dermal (Rabbit): 30 mg/3 day (mild).

Inhalation: Inhalation may irritate nose, throat and lungs.

Ingestion: Although low in toxicity, ingestion can be harmful. May irritate mouth & gastrointestinal tract. Oral LD(Lo) (Infant): 1260 mg/kg. LD(50) (Rat): 4220 mg/kg Ref. (1) Sec. IX.

First aid:

Eyes: Flush with water for 15 minutes while holding eyelids open. Get medical attention if irritation persists.

Skin: Wash with plenty of water. Wash affected clothing before reuse.

Inhalation: If dust inhalation excessive remove to fresh air. If discomfort from inhalation proves persistent, consult with a physician.

Ingestion: Drink a large quantity of water to dilute the material.

CONTINUED ON PAGE 02

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SODIUM BICARB USP POWD 1 100#
PRODUCT CODE: 16-10930-02

DATE: 06/20/88 PAGE 02

SECTION II Health Hazards

CONTINUED

Other Information: Eye or skin diseases and breathing or respiratory disorders will be aggravated by exposure to this chemical.

NOTE TO PHYSICIAN:

Overdosing can lead to systemic alkalosis and/or expansion in the extracellular fluid volume with edema.

Not reported as a carcinogen.

SECTION III Special Protection Information

Respiratory Protection: Where dust or liquid mist exceeds PEL/TLV limitations use a dust respirator approved by NIOSH.

Ventilation Required: Local exhaust ventilation recommended where dusty conditions prevail.

Protective Clothing:

Eyes: Head covering and chemical safety goggles recommended. Do not wear contact lenses.

Skin: Wear long-sleeves and trousers and gloves for routine product use. Cotton gloves are sufficient for dry product; wear impervious gloves when handling solutions. Use rubber, neoprene or similar materials that will not let alkaline solutions penetrate.

Additional Protective Measures: Safety shower, eye bath and washing facilities should be available.

SECTION IV Fire & Explosion Hazard Data

Flash Point (Method): Not flammable

Flammable Limits (% Volume in Air):

Upper: N/A

Lower: N/A

Extinguishing Media: N/A

Special Fire Fighting Procedures: Firefighters should wear self-contained breathing apparatus and full bunker gear.

Unusual Fire and Explosion Hazards: Carbon dioxide is released when product is heated.

CONTINUED ON PAGE 03

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SODIUM BICARB USP POWD 1 100#
PRODUCT CODE: 16-10930-02

DATE: 06/20/88 PAGE 03

SECTION V Physical Data

Boiling Point: None

Melting Point: Decomposes

Specific Gravity (H₂O=1): 2.16

Bulk Density: 60 lbs./cu. ft.

Vapor Pressure (MM HG.): N/A

Vapor Density (AIR=1): N/A

Evaporation Rate (_____ =1): N/A

Solubility in Water: Approx. 9% @ 68 deg. F.

Percent Volatile by Volume: N/A

pH: 1% solution - 8 to 8.6

Appearance and Odor: White crystals or powder, odorless.

SECTION VI Reactivity Data

Stability: Stable

Incompatibility: Reacts with acids to form carbon dioxide gas, salt, and water. Avoid monoammonium phosphate, aluminum and phosphorus pentoxide and water. In moist air forms sodium carbonate, an irritant. High temperature exposure (About 228 deg. F) causes rapid decomposition to sodium carbonate, water, and carbon dioxide.

Hazardous Decomposition Products: Carbon dioxide gas when exposed to high heat, carbon dioxide is an asphyxiant and may affect respiration rate or interfere with breathing.

Hazardous Polymerization: Will not occur.

SECTION VII Spill and Leak Procedures

Steps to be taken if material is released or spilled: Sweep up dry and shovel into containers for disposal or, depending on applicable disposal regulations, neutralize with acid. Good ventilation is required during neutralization due to release of CO₂ gas.

Waste Disposal Method: Observe all federal, state and local laws concerning health and environment. Dispose of containers of dry solid waste in an approved disposal facility. Liquid wastes depending on local regulations may have to be disposed of by an approved contractor, or, alternately, run to sewer with plenty of water.

Material is not a hazardous waste by terms of RCRA 40 CFR

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SODIUM BICARB USP POWD 1 100# DATE: 06/20/88 PAGE 04
PRODUCT CODE: 16-10930-02

CONTINUED

SECTION VII Spill and Leak Procedures
116-117.

Material is not an EPA hazardous substance, as defined in 40 CFR 116-117.

FDA - 21 CFR - GRAS for humans and animals.

USDA - 9 CFR.

SECTION VIII D.O.T. Shipping Information

Proper Shipping Name:	NONE
Hazard Class:	NONE
ID Number:	NONE
Label Requirements:	NONE
Reportable Quantity:	NONE
Other Information:	

SECTION IX Additional Information

This information may be of importance to you:

FDA regulations apply to U.S.P., Food, and Feed grade products (21 CFR) GRAS for humans and animals. Not for food, feed or drug use unless labeled "Food Grade", "Feed Grade" or U.S.P. as applicable. Store in a cool dry area away from acids.

References:

- (1) "Registry of Toxic Effects of Chemical Substances" NIOSH U.S. Dept. HHS, 1979.

NPCAHMIS 100 B

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SODIUM BICARB USP POWD 1 100#
PRODUCT CODE: 16-10930-02

DATE: 06/20/88 PAGE 05

***** END OF REPORT *****

NAME: GENE TURNER

DATE ISSUED: 06/20/1986
DATE REVISED: 11/17/1987

< = LESS THAN
> = MORE THAN

N/A = NOT APPLICABLE
N/D = NOT DETERMINED
N/E = NOT ESTABLISHED

UNK = UNKNOWN

The information provided in this Material Safety Data Sheet has been obtained from sources believed to be reliable. Thompson-Hayward Chemical Co. provides no warranties, either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. This information is offered for your information, consideration and investigation. You should satisfy yourself that you have all current data relevant to your particular use. Thompson-Hayward Chemical Company knows of no medical condition, other than those noted on this material safety data sheet, which are generally recognized as being aggravated by exposure to this product.

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Sodium acid sulfite, sodium hydrogen sulfite, sodium hydrosulfite;
CAS 7631-90-5.

Trade Names: None found.

Uses: A disinfectant, bleach, antiseptic, and preservative; a laundry stripper, coagulant in rubber manufacture; in dyeing of cloth.

PHYSICAL INFORMATION

Appearance: White to yellowish crystalline powder; or clear yellowish solution.

Odor: Sulfur-like (rotten eggs) when moist.

Behavior in Water: Dissolves.

HEALTH HAZARD INFORMATION

OSHA Standard: None established.

NIOSH Recommended Limit: None established.

ACGIH Recommended Limit: Average 8 hour exposure -- 5 mg/m³.

Short Term Exposure:

Inhalation: May cause irritation to nose, throat and lungs.

Skin: May cause irritation if not removed promptly.

Eyes: May cause irritation.

Ingestion: May cause irritation to mouth, throat and stomach. Allergic response may occur. This could include itching of ears and legs, nausea, cough, tightening of throat, and reddening of the skin.

Long Term Exposure:

Allergy may develop after repeated exposure.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Dept. of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move victim to fresh air. Give artificial respiration or oxygen as required.
Remove dust from nose. Seek medical attention, if necessary.

Skin: Remove contaminated clothing. Wash affected area with soap and water for at least five minutes. Seek medical attention, if necessary.

Eyes: Wash with water for at least 15 minutes. Seek medical attention, if necessary.

Ingestion: Clean dust from mouth. If conscious, give victim water or milk. Seek medical attention.

Note to Physician: Converted to sulfuric acid in stomach. Acute obstruction of alimentary canal may occur up to 3 weeks following ingestion.

FIRE AND EXPLOSION INFORMATION

General: Not combustible.

REACTIVITY

Conditions to Avoid: Breaks down slowly in air to form sodium sulfate and toxic fumes of sulfur oxides. Break down is speeded up by exposure to heat.

Materials to Avoid: Acids and oxidizing agents such as permanganates.

PROTECTIVE MEASURES

Storage and Handling: Store in a cool, dry place, in a tightly sealed container.

Engineering Controls: Ventilate to reduce dust levels as required. Sinks, showers and eyewash stations should be easily available.

Protective Clothing (Should not be substituted for proper handling and engineering controls)
Gloves, goggles and coveralls should be worn if contact with sodium bisulfite is likely.

Protective Equipment: A dust mask should be worn if levels become uncomfortable.

PROCEDURES FOR SPILLS AND LEAKS

Warn other workers of spill. Put on proper protective clothing and equipment. Sweep or vacuum up spilled powder. Cover spilled liquid with soda ash, absorb on vermiculite or other inert material. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Tower Building, Albany, New York 12237.

488

JAN 24 198

SODIUM CARBONATE MONOHYDRATE USP REGULAR

PAGE:

MATERIAL SAFETY DATA SHEET

ACCEPTED BY O.S.H.A. AS ESSENTIALLY SIMILAR TO O.S.H.A. FORM 20

ASHLAND OIL INC., ESTIG, P.O. BOX 2458, COLUMBUS, OHIO 43216

24-HOUR EMERGENCY TELEPHONE: 606-324-1133 (LOCATED AT ASHLAND, KENTUCKY)

ASHLAND PRODUCT NAME: SODIUM CARBONATE MONOHYDRATE USP REGULAR

DATA SHEET NO: 0017093-001

LATEST REVISION DATE: 04/78-78102

***** SECTION I-PRODUCT IDENTIFICATION *****

GENERAL OR GENERIC ID: ALKALI

HAZARD CLASSIFICATION: (99) NOT APPLICABLE

***** SECTION II-HAZARDOUS COMPONENTS *****

INGREDIENTPERCENTTLV

SODIUM CARBONATE

>60 %

15 MG/CUM

()

() : TLV IS FOR TOTAL NUISANCE DUST. FOR THE RESPIRABLE FRACTION, THE TLV IS 5 MG/CUM. THE ACGIH TLV FOR TOTAL NUISANCE DUST IS 10 MG/CUM.

***** SECTION III-PHYSICAL DATA *****

PROPERTYREFINEMENTMEASUREMENT

INITIAL BOILING POINT NOT APPLICABLE

VAPOR PRESSURE NOT APPLICABLE

VAPOR DENSITY NOT APPLICABLE

SPECIFIC GRAVITY

2.533

a 68.00 DEG

(20.00 DEG

PERCENT VOLATILES NOT APPLICABLE

EVAPORATION RATE NOT APPLICABLE

***** SECTION IV-FIRE AND EXPLOSION DATA *****

FLASH POINT(CLOSED CUP) NOT APPLICABLE

LOWER EXPLOSIVE LIMIT NOT APPLICABLE

EXTINGUISHING MEDIA: WATER FOG

SPECIAL FIREFIGHTING PROCEDURES: SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

* ***** SECTION IV-FIRE AND EXPLOSION DATA (CONTINUED) *****

UN TUAL FIRE & EXPLOSION HAZARDS: NOT APPLICABLE

***** SECTION V-HEALTH HAZARD DATA *****

THRESHOLD LIMIT VALUE: 15 MG/CUM

EFFECTS OF OVEREXPOSURE: FOR PRODUCT

E 5 - CAN CAUSE MODERATE IRRITATION, REDNESS, TEARING.

SH - CAN CAUSE IRRITATION.

BREATHING - OF DUST CAN CAUSE IRRITATION OF NASAL AND RESPIRATORY PASSAGES.

SWALLOWING - RESULTS IN SEVERE DAMAGE TO MUCOUS MEMBRANES.

FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY, GET MEDICAL ATTENTION.

1. SWALLOWED: DO NOT INDUCE VOMITING. VOMITING WILL CAUSE FURTHER DAMAGE TO THE THROAT. DILUTE BY GIVING WATER. GIVE MILK OF MAGNESIA. KEEP WARM, QUIET. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: REMOVE INDIVIDUAL TO FRESH AIR

***** SECTION VI-REACTIVITY DATA *****

HAZARDOUS POLYMERIZATION: CANNOT OCCUR
STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG MINERAL ACIDS (E.G. H₂SO₄, HCL, ETC.), STRONG ORGANIC ACIDS

***** SECTION VII-SPILL OR LEAK PROCEDURES *****

STEPS TO BE TAKEN IN CASE MATERIAL[†] IS RELEASED OR SPILLED:

SMALL SPILL: COVER WITH SODA ASH. MIX AND SCOOP INTO A BEAKER OF WATER.

L. SE SPILL: COLLECT AND ADD SLOWLY TO LARGE VOLUME OF WATER.

***** SECTION VII-SPILL OR LEAK PROCEDURES (CONTINUED) *****

WASTE DISPOSAL METHOD:

SMALL SPILL: DISSOLVE IN LARGE AMOUNT OF WATER AND ADD SODA ASH. NEUTRALIZE WITH 6M-HCL. FLUSH DOWN DRAIN WITH EXCESS WATER.

LARGE SPILL: COLLECT AND ADD TO A LARGE CONTAINER OF WATER. STIR IN SLIGHT EXCESS OF SODA ASH. LET STAND 24 HOURS. DECANT INTO ANOTHER CONTAINER, NEUTRALIZE WITH 6M-HCL. FLUSH DOWN DRAIN WITH LARGE EXCESS OF WATER. DEPOSIT SLUDGE IN A LANDFILL.

***** SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED *****

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MESA JOINTLY APPROVED SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE PIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE IS ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MESA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER).

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL) AND/OR LOCAL EXHAUST VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES. (SEE YOUR SAFETY EQUIPMENT SUPPLIER).

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (SEE YOUR SAFETY EQUIPMENT SUPPLIER).

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

***** SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS *****

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THIS DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH ASHLAND OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company

DIVISION OF ASHLAND OIL INC.

P.O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 899-3333

Ashland

DEFINITIONS

THIS DEFINITION PAGE IS INTENDED FOR USE WITH MATERIAL SAFETY DATA SHEETS SUPPLIED BY THE ASHLAND CHEMICAL COMPANY. QUESTIONS CONCERNING THESE SHEETS SHOULD BE DIRECTED TO THE ENVIRONMENTAL AND OCCUPATIONAL SAFETY DEPARTMENT.

JAN 24 1983

SECTION I PRODUCT IDENTIFICATION

PRODUCT CLASS: GENERAL OR GENERIC IDENTIFICATION.

HAZARDOUS CLASSIFICATION: PRODUCT MEETS DOT CRITERIA FOR HAZARDS LISTED.

SECTION II HAZARDOUS COMPONENTS

A HAZARDOUS INGREDIENT IS ONE WHICH MEETS ONE OR MORE OF THE FOLLOWING CRITERIA:

1. IT IS LISTED IN THE ANNUAL REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES, OR IT IS KNOWN TO BE TOXIC WITHIN THE PARAMETERS OF THAT REGISTRY.

AND/OR

2. IT HAS A OSHA ESTABLISHED, 8-HOUR TIME-WEIGHTED AVERAGE PERMISSIBLE EXPOSURE LIMIT (PEL) OR ACCEPTABLE CEILING (C) OR AN AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS' (ACGIH) THRESHOLD LIMIT VALUE, AND BY NATURE OF THE PRODUCT OR ITS KNOWN USE, IT IS LIKELY TO BECOME AIRBORNE.

AND/OR

3. IT CONTRIBUTES TO ONE OR MORE OF THE FOLLOWING HAZARDS OF THE PRODUCT:
 - A. FLASHPOINT BELOW 200 DEG F (CC), OR SUBJECT TO SPONTANEOUS HEATING OR DECOMPOSITION.
 - B. CAUSES SKIN BURNS. (DOT)
 - C. STRONG OXIDIZING AGENT. (DOT)
 - D. SUBJECT TO HAZARDOUS POLYMERIZATION.

EACH INGREDIENT MEETING ONE OR MORE OF THE ABOVE CRITERIA IS LISTED IN SECTION II IF PRESENT AT A LEVEL AT LEAST GREATER THAN ONE PERCENT. INGREDIENTS WHICH ARE CLAIMED TO BE CARCINOGENS, TERATOGENS, MUTAGENS, OR CAUSATIVE AGENTS OF OTHER REPRODUCTIVE DISORDERS ARE LISTED IF KNOWN OR BELIEVED TO BE PRESENT, PROVIDED THAT THE DATA SUPPORTING SUCH CLAIMS IS CONSIDERED VALID.

EACH HAZARDOUS INGREDIENT IS LISTED BY CHEMICAL, GENERIC, OR PROPRIETARY NAME, ITS LEVEL IN THE PRODUCT IS EXPRESSED AS 1% OR LESS, 1-10%, 10-30%, 30-60%, OR GREATER THAN 60%, OR BY OTHER MEANS.

SECTION III PHYSICAL DATA

INITIAL BOILING POINT: IF LIQUID AT 68 DEG F.

VAPOR PRESSURE: IF LIQUID AT 68 DEG F OR WHICH SUBLIMES.

VAPOR DENSITY: FOR VOLATILE PORTION OF PRODUCT.

SPECIFIC GRAVITY: IF SPECIFIC GRAVITY OF PRODUCT IS NOT KNOWN, INDICATED AS <1, =1, OR >1.

PERCENT VOLATILES: PERCENTAGE OF MATERIAL WITH INITIAL BOILING POINT BELOW 425 DEG F.

EVAPORATION RATE: INDICATED AS FASTER OR SLOWER THAN ETHYL ETHER, UNLESS STATED.

SECTION IV PRODUCT IDENTIFICATION

FLASH POINT: CLOSED CUP.

LOWER EXPLOSION LIMIT: INDICATED FOR COMPONENT WITH LOWEST VALUE.

HAZARDOUS DECOMPOSITION PRODUCTS: KNOWN HAZARDOUS PRODUCTS RESULTING FROM HEATING, BURNING, ETC., OR REACTED RAW MATERIALS WHICH MAY ARISE THROUGH HEATING, BURNING, ETC.

SPECIAL FIREFIGHTING PROCEDURES: INDICATES EQUIPMENT TO PROTECT FIREMEN FROM TOXIC PROCEDURES OF COMBUSTION OR IF WATER IS NOT TO BE USED.

UNUSUAL FIRE AND EXPLOSION HAZARDS: HAZARDS NOT COVERED BY OTHER SECTIONS OF THIS REPORT ARE SHOWN HERE.

SECTION V HEALTH HAZARD DATA

RECIPIENTS OF THIS DATA SHEET SHOULD CONSULT THE OSHA SAFETY AND HEALTH STANDARDS (29 CFR 1910), PARTICULARLY SUBPART G - OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL, AND SUBPART I - PERSONAL PROTECTIVE EQUIPMENT, FOR GENERAL GUIDANCE ON CONTROL OF POTENTIAL OCCUPATIONAL HEALTH HAZARDS.

PERMISSIBLE EXPOSURE LEVEL: OSHA ESTABLISHED PEL--IF NONE AVAILABLE, ADOPTED VALUE.

EFFECTS OF OVEREXPOSURE: GIVEN IN GENERAL TERMS, LOCAL AND SYSTEMIC EFFECTS TO THE EYES, SKIN, IF MATERIAL IS INHALED, UNLESS NOT APPLICABLE DUE TO PHYSICAL FORM OF PRODUCT.

SECTION VI REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION RESULTING IN A LARGE RELEASE OF ENERGY.

STABILITY: CONDITIONS TO AVOID IF UNSTABLE UNDER NORMAL CIRCUMSTANCES.

INCOMPATIBILITY: MATERIALS TO AVOID.

SECTION VII SPILL OR LEAK PROCEDURES

REASONABLE PRECAUTIONS TO BE TAKEN AND THE METHODS OF CLEAN-UP TO BE USED IN THE EVENT OF SPILLAGE OF THE PRODUCT. CONSULT FEDERAL, STATE AND LOCAL REGULATIONS FOR ACCEPTED PROCEDURES AND ANY REPORTING OR NOTIFICATION REQUIREMENTS.

SECTION VIII PROTECTIVE EQUIPMENT TO BE USED

THIS SECTION INDICATES PROTECTIVE EQUIPMENT TO BE USED WHEN HANDLING THE PRODUCT.

SECTION IX SPECIAL PRECAUTIONS OR OTHER COMMENTS

THIS SECTION IS TO COVER ANY RELEVANT POINTS NOT PREVIOUSLY MENTIONED.

ADDITIONAL COMMENTS

ASHLAND WISHES TO INFORM YOU THAT SERIOUS ACCIDENTS HAVE RESULTED FROM THE MISUSE OF "EMPTIED" CONTAINERS (DRUMS, 1 AND 5 GALLON PAILS, ETC.). REFER TO SECTIONS IV AND IX.

WE RECOMMEND THAT CONTAINERS BE EITHER PROFESSIONALLY RECONDITIONED FOR REUSE BY CERTIFIED FIRMS OR PROPERLY DISPOSED OF BY CERTIFIED FIRMS TO HELP REDUCE THE POSSIBILITY OF AN ACCIDENT. DISPOSAL OF CONTAINERS SHOULD BE IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS. "EMPTY" DRUMS SHOULD NOT BE GIVEN TO INDIVIDUALS.



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME

Sodium Chloride

FORMULA

NaCl

SYNONYM OR CROSS REFERENCE

CAS NO: 7647-14-5

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD

SECTION III . PHYSICAL DATA

BOILING POINT
2669°F.

MELTING POINT

VAPOR PRESSURE
1 mmHg @ 1589°

SPECIFIC GRAVITY
2.163

VAPOR DENSITY (AIR=1)

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY
26.4 @ 20°C.

EVAPORATION RATE
(_____ = 1)

APPEARANCE
White crystalline, no odor

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)

FLAMMABLE LIMITS

Lower

Upper

FIRE EXTINGUISHING
MEDIA

SPECIAL FIRE-FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARD

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE

HEALTH HAZARDS Mild irritant to eyes and skin. If inhaled, dust leaves taste with mild irritation to mucous membrane in nose and throat.

FIRST AID PROCEDURES
Wash area with clean water.

CHEMICAL NAME

SECTION VI . REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (materials to avoid)
Neutral inactive salt

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII . SPILL AND DISPOSAL PROCEDURES**SPILLS****DISPOSAL**

Some states are now setting maximum limits on chlorides in waste effluent. Check your state for requirements. Dilution is the only practical method to meet requirements.

SECTION VIII . PROTECTION INFORMATION**RESPIRATORY PROTECTION (specify type)**

VENTILATION	LOCAL	SPECIAL
	MECHANICAL (general)	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
-------------------	----------------

OTHER PROTECTIVE EQUIPMENT

SECTION IX . HANDLING AND STORAGE PRECAUTIONS**STORAGE & HANDLING**

Transport in dry equipment. Storage should be in dry location under water if planned to use as liquid.

SECTION X . MISCELLANEOUS INFORMATION

Date Issued: _____ Revision: _____ Approved by: R. M. Mitchell
Manager, Quality Assurance

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MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME
Sodium Hydroxide

FORMULA
NaOH

SYNONYM OR CROSS REFERENCE

(Caustic Soda Sodium Hydrate
White Caustic Lye)

CAS NO: 1310-73-2

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD
Caustic
Corrosive
Irritant

SECTION III . PHYSICAL DATA

BOILING POINT
1390°C

MELTING POINT
318.4°C

VAPOR PRESSURE
1 mm at 739°C

SPECIFIC GRAVITY
2.120 at 20°/4°C

VAPOR DENSITY (AIR=1)

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY
Soluble

EVAPORATION RATE
(_____ = 1)

APPEARANCE
White, deliquescent pieces, lumps or sticks

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)
Noncombustible

FLAMMABLE LIMITS

Lower Upper

FIRE EXTINGUISHING
MEDIA Water

SPECIAL FIRE-FIGHTING PROCEDURES Flood with water using care, do not splatter or splash this material.

UNUSUAL FIRE AND EXPLOSION HAZARD Noncombustible but solid form in contact with moisture or water may generate sufficient heat to ignite combustible materials.

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE

0.02 mg/m³

HEALTH HAZARDS Highly corrosive action upon all body tissue. Highly irritant causing dermatitis, causes burns, ulceration, corneal, and deep skin burns.

FIRST AID PROCEDURES Speed in removing this caustic material in contact with skin is of very importance to avoid burns. Remove all contaminated clothing at once and give patient shower under deluge type of water. Irrigate eyes with warm water.

CHEMICAL NAME

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Moisture, Metals, Explosives, Organic Peroxides
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Absorbs carbon dioxide and moisture from air.

HAZARDOUS DECOMPOSITION PRODUCTS

On contact with metals may generate hydrogen gas.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID None
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES

SPILLS

Collect and remove with a broom in a large bucket. Dilute with water and neutralize with 6M HCl. Drain into a sewer with sufficient water.

DISPOSAL

Put into a large vessel containing water. Neutralize with 6M HCl. Discharge into the sewer with sufficient water.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Self-contained breathing apparatus.

VENTILATION	LOCAL Sufficient to minimize concentration	SPECIAL None
	MECHANICAL (general) Adequate ventilation	OTHER None
PROTECTIVE GLOVES Rubber gloves		EYE PROTECTION Goggles

OTHER PROTECTIVE EQUIPMENT
Plastic overalls

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Protect against physical damage of containers. Store in a dry place. Protect against moisture, store separately from acids, metals, oxidizing materials like peroxide, explosives.

SECTION X. MISCELLANEOUS INFORMATION

Avoid skin contact at all cost.

Date issued: 8/3/83

Approved by R. M. Mitchell
Manager, Quality Assurance

Revision No. & Date Issued: _____

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SODIUM SULFITE
SODIUM SULFITE
SODIUM SULFITE

cat# S430-500

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7757-83-7

SUBSTANCE: **SODIUM SULFITE**

TRADE NAMES/SYNONYMS:

ANHYDROUS SODIUM SULFITE; DISODIUM SULFITE; SODIUM SULPHITE;
SODIUM SULFITE, ANHYDROUS; SULFUROUS ACID, SODIUM SALT (1:2);
SULFUROUS ACID, DISODIUM SALT; EXSICCATED SODIUM SULFITE; S-430; S-447;

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: NA2-S-03

MOLECULAR WEIGHT: 126.04

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: SODIUM SULFITE

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: ODORLESS, WHITE CRYSTALS OR POWDER WITH A SALINE, SULFUROUS

TASTE. BOILING POINT: DECOMPOSES MELTING POINT: DECOMPOSES @ RED HEAT

SPECIFIC GRAVITY: 2.633 PH: APPROXIMATELY 9.0

SOLUBILITY IN WATER: 12.5% @ 0 C

SOLVENT SOLUBILITY: SOLUBLE IN GLYCEROL; SLIGHTLY SOLUBLE IN ALCOHOL;

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. DO NOT SCATTER SPILLED MATERIAL WITH MORE WATER THAN NEEDED FOR FIRE CONTROL. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS VAPORS, KEEP UPWIND.

TOXICITY

SODIUM SULFITE:

ANHYDROUS: 115 MG/KG INTRAVENOUS-RAT LD50; 950 MG/KG INTRAPERITONEAL-MOUSE LD50; 130 MG/KG INTRAVENOUS-MOUSE LD50; 1300 MG/KG SUBCUTANEOUS-DOG LDLO; 1300 MG/KG SUBCUTANEOUS-CAT LDLO; 200 MG/KG INTRAVENOUS-CAT LDLO; 2825 MG/KG ORAL-RABBIT LDLO; 65 MG/KG INTRAVENOUS-RABBIT LD50; 600 MG/KG SUBCUTANEOUS-GUINEA PIG LDLO; 200 MG/KG INTRAVENOUS-GUINEA PIG LDLO; 95 MG/KG INTRAVENOUS-HAMSTER LD50; 7 MG/KG ORAL-HUMAN TDLO (THIDD6); 300 MG/KG SUBCUTANEOUS-RABBIT LDLO; MUTAGENIC DATA (RTECS).
HEPTAHYDRATE: 277 MG/KG INTRAPERITONEAL-MOUSE LD50; 743 MG/KG INTRAVENOUS-MAN LDLO.

CARCINOGEN STATUS: NONE.

SODIUM SULFITE IS A SENSITIZER AND MAY BE IRRITATING TO THE EYES, SKIN AND MUCOUS MEMBRANES. ASTHMATICS MAY BE AT AN INCREASED RISK FROM EXPOSURE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
SODIUM SULFITE:
SENSITIZER.

ACUTE EXPOSURE- MAY CAUSE MUCOUS MEMBRANE IRRITATION. INHALATION OF THIS MATERIAL MAY CAUSE ADVERSE REACTIONS INCLUDING BRONCHOSPASMS IN SUSCEPTIBLE INDIVIDUALS, ESPECIALLY ASTHMATICS. SYMPTOMS MAY INCLUDE FLUSHING, SEVERE WHEEZING, SWELLING OF THE THROAT, AND PALATAL AND GENERALIZED ITCHING.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE SENSITIZATION IN PREVIOUSLY EXPOSED INDIVIDUALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

SODIUM SULFITE:

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION AND CONTACT DERMATITIS. SOME SULFITES MAY CAUSE SENSITIZATION DERMATITIS IN PREVIOUSLY EXPOSED INDIVIDUALS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONTACT DERMATITIS. REPEATED EXPOSURE TO SULFITES MAY RESULT IN SENSITIZATION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

SODIUM SULFITE:

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION AND REDNESS.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

SODIUM SULFITE:

SENSITIZER.

ACUTE EXPOSURE- MAY CAUSE GASTROINTESTINAL IRRITATION WITH ABDOMINAL PAIN, NAUSEA, VOMITING AND DIARRHEA. IN SUSCEPTIBLE INDIVIDUALS, PARTICULARLY ASTHMATICS, SULFITES MAY CAUSE WHEEZING, SHORTNESS OF BREATH, UNCONSCIOUSNESS AND ANAPHYLAXIS. SIGNS AND SYMPTOMS MAY INCLUDE GENERALIZED FLUSHING AND ITCHING AND RESPIRATORY ARREST. THE ESTIMATED HUMAN LETHAL DOSE IS 10 GRAMS. IN ANIMALS, LARGE DOSES HAVE CAUSED VIOLENT COLIC AND DIARRHEA, CIRCULATORY DISTURBANCES, CENTRAL NERVOUS SYSTEM DEPRESSION AND DEATH.

CHRONIC EXPOSURE- REPEATED INGESTION OF FOOD CONTAINING SULFITES MAY CAUSE SENSITIZATION.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

SODIUM SULFITE:

MINERAL ACIDS (STRONG): REACTS TO FORM SULFUR DIOXIDE.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE TOXIC OXIDES OF SULFUR AND TOXIC SODIUM OXIDE.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL
TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING
OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE
ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

NONE REPORTED.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER
DISPOSAL. DO NOT FLUSH WITH WATER. KEEP UNNECESSARY PEOPLE AWAY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE
PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN
ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND
IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND
BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND
HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE
FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND
HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE,
HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.
CREATION DATE: 12/19/84 REVISION DATE: 10/13/89

-ADDITIONAL INFORMATION-

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MATERIAL SAFETY DATA SHEET

348

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

CHEMICAL NAME

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Sodium Sulfite	FORMULA Na_2SO_3
SYNONYM OR CROSS REFERENCE	CAS NO: 7757-83-7

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD
----------	------------------

SECTION III. PHYSICAL DATA

BOILING POINT Decomposes	MELTING POINT
VAPOR PRESSURE	SPECIFIC GRAVITY 2.63
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Soluble	EVAPORATION RATE (_____ = 1)
APPEARANCE White fine crystals or powder	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA			
SPECIAL FIRE-FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE ivn-mus LD ₅₀ : 175 mg/kg
HEALTH HAZARDS

FIRST AID PROCEDURES
If swallowed, if conscious, induce vomiting and call a physician at once.

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (materials to avoid)			

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES**SPILLS**

Sweep up spills into a localized area. Add equal volume of soda ash and dilute with to obtain a slurry. Add calcium hypochlorite with caution. Dilute and neutralize with 6M-HCl or 6MNaOH.

DISPOSAL

Dispose through a waste treatment plant providing local environmental regulations permit.

SECTION VIII. PROTECTION INFORMATION**RESPIRATORY PROTECTION (specify type)**

Work in hood or wear a respirator

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER
PROTECTIVE GLOVES Rubber gloves	EYE PROTECTION Safety glasses	

OTHER PROTECTIVE EQUIPMENT
Approved working clothes

SECTION IX. HANDLING AND STORAGE PRECAUTIONS**STORAGE & HANDLING**

Avoid breathing dust. Keep in well-closed container in a cool place. Wash thoroughly after handling.

SECTION X. MISCELLANEOUS INFORMATION

Date Issued: 8/3/83 Revision: _____ Approved by: R. M. Mitchell
Manager, Quality Assurance

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JUN 1986

ATTN: SAFETY DIRECTOR
AT & T BELL LABORATORIES
ACCOUNTS PAYABLE DEPT
P O BOX 800
SHORT HILLS NJ 07078

DATE: 06/06/86
CUST # 131059 P.O. # 1185

M A T E R I A L S A F E T Y D A T A S H E E T PAGE: 1

IDENTIFICATION

PRODUCT # 23932-1 NAME: SODIUM SULFITE, ANHYDROUS, 98+%, A.C.S.
CAS # 7757-83-7 REAGENT

TOXICITY HAZARDS

RTECS # WE2150000

SODIUM SULFITE (2:1)

TOXICITY DATA

IVN-RAT LD50:115 MG/KG
IPR-MUS LD50:950 MG/KG
IVN-MUS LD50:130 MG/KG
IVN-RBT LD50:65 MG/KG
IVN-HAM LD50:95 MG/KG

JPETAB 101,101,51
ARZNAD 31,1713,81
JPETAB 101,101,51
JPETAB 101,101,51
JPETAB 101,101,51

REVIEWS, STANDARDS, AND REGULATIONS
REPORTED IN EPA TSCA INVENTORY, 1983
EPA GENETIC TOXICOLOGY PROGRAM, JANUARY 1984

HEALTH HAZARD DATA

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
CAUSES EYE AND SKIN IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS
AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL
RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT,
GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

ADDITIONAL INFORMATION

INGESTION RESULTS IN IRRITATION OF THE GASTROINTESTINAL TRACT. LARGE
DOSES MAY CAUSE VIOLENT COLIC AND DIARRHEA, CIRCULATORY DISTURBANCES,
CENTRAL NERVOUS DEPRESSION AND EVEN DEATH. PERSONS WITH ALLERGIES AND/
OR ASTHMA MAY EXHIBIT HYPERSENSITIVITY TO SULFITES.

PHYSICAL DATA

SPECIFIC GRAVITY: 2.633

FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA

NONCOMBUSTIBLE.

USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.

USA
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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE: 2

CATALOG # 23932-1

NAME: SODIUM SULFITE, ANHYDROUS, 98+%, A.C.S. REAGENT

UNUSUAL FIRE AND EXPLOSION HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

----- REACTIVITY DATA -----

INCOMPATIBILITIES

STRONG ACIDS

AIR-SENSITIVE.

MOISTURE-SENSITIVE.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
SULFUR OXIDES

----- SPILL OR LEAK PROCEDURES -----

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

AVOID RAISING DUST.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

FOR SMALL QUANTITIES: CAUTIOUSLY ADD TO A LARGE STIRRED EXCESS OF WATER. ADJUST THE PH TO NEUTRAL, SEPARATE ANY INSOLUBLE SOLIDS OR LIQUIDS AND PACKAGE THEM FOR HAZARDOUS-WASTE DISPOSAL. FLUSH THE AQUEOUS SOLUTION DOWN THE DRAIN WITH PLENTY OF WATER. THE HYDROLYSIS AND NEUTRALIZATION REACTIONS MAY GENERATE HEAT AND FUMES WHICH CAN BE CONTROLLED BY THE RATE OF ADDITION.

OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

WEAR APPROPRIATE OSHA/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.

DO NOT BREATHE DUST.

AVOID CONTACT WITH EYES, SKIN AND CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

WASH THOROUGHLY AFTER HANDLING.

IRRITANT.

KEEP TIGHTLY CLOSED.

AIR- AND MOISTURE-SENSITIVE.

STORE IN A COOL DRY PLACE.

----- ADDITIONAL PRECAUTIONS AND COMMENTS -----

NOT APPLICABLE

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FORM 320 REV 2/84

SODIUM THIOSULFATE
SODIUM THIOSULFATE
SODIUM THIOSULFATE

Cat # S-446-500

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
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EMERGENCY NUMBER: (201) 796-7100
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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7772-98-7

SUBSTANCE: **SODIUM THIOSULFATE**

TRADE NAMES/SYNONYMS:

THIOSULFURIC ACID (H₂S₂O₃), DISODIUM SALT; THIOSULFURIC ACID, DISODIUM SALT;
DISODIUM THIOSULFATE; SODIUM HYPOSULFITE; SODIUM THIOSULFATE ANHYDROUS;
SODIUM THIOSULPHATE; DISODIUM THIOSULPHATE; SODIUM THIOSULFATE (NA₂S₂O₃);
SODIUM OXIDE SULFIDE; SODIUM OXIDE SULFIDE (NA₂S₂O₃); HYPO; SODIOTHIOIOL;
CHLORINE CONTROL; S-HYDRIL; CHLORINE CURE; DECHLOR-IT; S-446; NA₂S₂O₃;

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: NA₂-S₂-O₃

MOLECULAR WEIGHT: 158.11

CERCLA RATINGS (SCALE 0-3): HEALTH=1 FIRE=0 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: SODIUM THIOSULFATE

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

PHYSICAL DATA

DESCRIPTION: ODORLESS, COLORLESS, MONOCLINIC CRYSTALS OR HYGROSCOPIC POWDER.

MELTING POINT: NOT AVAILABLE SPECIFIC GRAVITY: 1.667

PH: 6.5-8.0 IN SOLUTION SOLUBILITY IN WATER: 50X

SOLVENT SOLUBILITY: INSOLUBLE IN ALCOHOL.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:

NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

SODIUM THIOSULFATE:

ANHYDROUS: 4 GM/KG SUBCUTANEOUS-RABBIT LD₅₀; 6 GM/KG SUBCUTANEOUS-FROG LD₅₀.
PENTAHYDRATE: 300 MG/KG/7 DAYS ORAL-HUMAN TD₅₀; 5600 MG/KG
INTRAPERITONEAL-MOUSE LD₅₀; 2350 MG/KG INTRAVENOUS-MOUSE LD₅₀; 3000 MG/KG
INTRAVENOUS-DOG LD₅₀.

CARCINOGEN STATUS: NONE.

SODIUM THIOSULFATE MAY BE IRRITATING. THE TOXICITY HAS NOT BEEN FULLY
CHARACTERIZED.

HEALTH EFFECTS AND FIRST AID

INHALATION:

SODIUM PENTAHYDRATE:

ACUTE EXPOSURE- NO DATA AVAILABLE.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

SODIUM THIOSULFATE:

ACUTE EXPOSURE- MAY BE IRRITATING.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
ATTENTION IMMEDIATELY.

EYE CONTACT:

SODIUM THIOSULFATE:

ACUTE EXPOSURE- MAY BE IRRITATING.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

SODIUM THIOSULFATE:

ACUTE EXPOSURE- SODIUM THIOSULFATE IS POORLY ABSORBED FROM THE BOWEL AND ACTS AS AN OSMOTIC CATHARTIC. INGESTION OF LARGE AMOUNTS MAY CAUSE DIARRHEA. THE PROBABLE LETHAL DOSE FOR HUMANS IS 0.5-5.0 GM/KG.
CHRONIC EXPOSURE- HUMAN EXPOSURE TO 300 MG/KG OF THE PENTAHYDRATE, FOR SEVEN DAYS, RESULTED IN CYANOSIS. SODIUM THIOSULFITE IS PERMITTED AS A FOOD ADDITIVE. POSSIBLE HUMAN EXPOSURE EXISTS, DUE TO MIGRATION TO FOOD FROM PACKAGING MATERIALS.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

SODIUM THIOSULFATE:

ACIDS: REACTS RELEASING SULFUR DIOXIDE.
CHLORINE (SOLUTIONS): FORMS SODIUM HYDROSULFATE.
HALOGENS: REACTS.
IODINE: INCOMPATIBLE.
LEAD SALTS: INCOMPATIBLE.
MERCURY SALTS: INCOMPATIBLE.
METAL NITRATES: MAY FORM EXPLOSIVE MIXTURES.
OXIDANTS: REACTS.
POTASSIUM NITRATE: MIXTURE IS EXPLOSIVE ON HEATING.
SILVER SALTS: INCOMPATIBLE.
SODIUM NITRATE: MIXTURE IS EXPLOSIVE ON HEATING.
SODIUM NITRITE: MAY EXPLODE VIOLENTLY ON HEAT DRYING.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE TOXIC OXIDES OF SULFUR AND TOXIC SODIUM OXIDE.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

NONE REPORTED.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL. DO NOT FLUSH WITH WATER. KEEP UNNECESSARY PEOPLE AWAY.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE GENERAL DILUTION VENTILATION.

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION. THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC, INC.

CREATION DATE: 04/18/86

REVISION DATE: 10/13/89

-ADDITIONAL INFORMATION-

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MATERIAL SAFETY DATA SHEET (MSDS)
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24-HOUR EMERGENCY PHONE No.: (201) 859-2151
CHEMTREK # (800) 424-9300 NAT. RESPONSE CENTER # (800) 424-8802

(EMD File # 349)
(File Name: s5234)
(Page # 1)

NOV 1987

Section 1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM THIOSULFATE, ANHYDROUS
FORMULA: NA2S2O3
FORMULA WT: 158.11
CAS NO.: 7772-98-7
NIOSH/RTECS NO.: XN6476000
COMMON SYNONYMS: SODIUM HYPOSULFITE; THIOSULFURIC ACID, DISODIUM SALT
PRODUCT CODES: 3954

EFFECTIVE: 05/05/86
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 0 NONE
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 - NO HAZARD; 4 - EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION

MAY BE HARMFUL IF SWALLOWED
MAY CAUSE IRRITATION

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

Section 2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
-----------	---	---------

NOT APPLICABLE

Section 3 - PHYSICAL DATA

BOILING POINT: N/A VAPOR PRESSURE(MM HG): N/A

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MELTING POINT: N/A

VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: N/A
(H2O=1)

EVAPORATION RATE: N/A
(BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: ODORLESS CLEAR TO WHITE CRYSTALS.

Section 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED
BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED

SULFUR DIOXIDE

Section 5 - HEALTH HAZARD DATA

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION OF DUST MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION.

TARGET ORGANS

NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NONE IDENTIFIED

ROUTES OF ENTRY

NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE
LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.

INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED
PERSON TO FRESH AIR. GET MEDICAL ATTENTION.

EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15

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MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST
15 MINUTES.

Section 6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: HEAT
INCOMPATIBLES: STRONG ACIDS, IODINE, MERCURY, STRONG OXIDIZING AGENTS
DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

Section 7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

Section 8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION
TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION
CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS
HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, RUBBER GLOVES ARE
RECOMMENDED.

Section 9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE
AREA.
ISOLATE FROM INCOMPATIBLE MATERIALS.

J. T. Baker Company
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(EMD File # 349)
(File Name: s5234)
(Page # 4)

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Section 10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

(TM) AND (R) DESIGNATE TRADEMARKS.

N/A = NOT APPLICABLE OR NOT AVAILABLE

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JAN 1987

STARCH INDICATOR

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STARCH INDICATOR
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5456

MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **STARCH INDICATOR**

TRADE NAMES/SYNONYMS: (OHS40185)

CERCLA RATINGS (SCALE 0-3): HEALTH=U FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 0.2

COMPONENT: STARCH
CAS 9005-25-8

PERCENT: 0.83

COMPONENT: GLACIAL ACETIC ACID C2-H4-O2
CAS 64-19-7

PERCENT: 99

COMPONENT: WATER

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID BOILING POINT: 212 F (100 C)

MELTING POINT: 32 F (0 C) SPECIFIC GRAVITY: 1.0

VAPOR PRESSURE: 14 MMHG (WATER) EVAPORATION RATE: (ETHER = 1) >1

SOLUBILITY IN WATER: SOLUBLE VAPOR DENSITY: 0.7 (WATER)

5454

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING VAPORS OR DUSTS; KEEP UPWIND.

CARCINOGEN STATUS: NONE.
THE TOXICITY OF STARCH SOLUTION HAS NOT BEEN CHARACTERIZED.

HEALTH EFFECTS AND FIRST AID

INHALATION:

ACUTE EXPOSURE- NO DATA AVAILABLE. MAY BE IRRITATING.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:

ACUTE EXPOSURE- NO EFFECTS HAVE BEEN OBSERVED IN HUMANS. MAY BE IRRITATING.

CHRONIC EXPOSURE- NO EFFECTS HAVE BEEN OBSERVED IN HUMANS. MAY BE IRRITATING.

EYE CONTACT:

ACUTE EXPOSURE- NO DATA AVAILABLE. MAY BE IRRITATING.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

STARCH INDICATOR

PAGE 03 OF 04

INGESTION:

ACUTE EXPOSURE- NO DATA AVAILABLE. MAY CAUSE GASTROINTESTINAL IRRITATION.
NO SYSTEMIC EFFECTS REPORTED IN HUMANS.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF
WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET
MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
NONE KNOWN.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE ACRID SMOKE AND IRRITATING FUMES.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

NO REPORTS FOUND.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SOAK UP SPILL WITH VERMICULITE AND PLACE IN A SUITABLE CONTAINER.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE GENERAL DILUTION VENTILATION.

RESPIRATOR:
NONE REQUIRED.

-CLOTHING:
PROTECTIVE CLOTHING NOT REQUIRED. AVOID REPEATED OR PROLONGED CONTACT WITH
THIS SUBSTANCE.

GLOVES:
PROTECTIVE GLOVES ARE NOT REQUIRED BUT RECOMMENDED.

-EYE PROTECTION:
-EYE PROTECTION NOT REQUIRED, BUT ADVISABLE.

3454

11
STARCH INDICATOR

PAGE 04 OF 04

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 11/12/85

REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

5454

Witco

Allied-Kelite Division

Witco Corporation, 2701 Lake Street, Melrose Park, IL 60160-3041 Telephone 312-344-4300

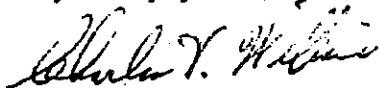
Effective January 1, 1989, we are required to notify you that SN. contains one or more of certain toxic chemicals. This product contains a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

This letter is attached to the product's Material Safety Data Sheet (MSDS). This letter must remain as an attachment to the MSDS and be considered as part of the MSDS and incorporated into it. Any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

The name and CAS (Chemical Abstracts Service) number for each applicable chemical in 40 CFR 372.65 is listed below. The percent by weight of each applicable toxic chemical, if present at 1% or more (0.1% for carcinogens), is included below, also.

<u>Chemical Name</u>	<u>% by Weight</u>	<u>CAS Number</u>
Nickel Compound	25.6	Nickel Compound

Very truly yours,



Charles V. Wilkie
Mgr., Regulatory Compliance
Allied-Kelite Division
Witco Corporation

WITCO MATERIAL SAFETY DATA SHEET

SULFAMATE SN

Product Code: 60001

PAGE 1

DIVISION AND LOCATION---SECTION I

Division: ALLIED-KELITE

Location: NEW HUDSON, MI

29111 MILFORD RD., NEW HUDSON, MI, 48165

Emergency Telephone Number: (313) 437-8161

Transportation Emergency: CHEM TREC 1-(800) 424-9300 (U.S. and Canada)

CHEMICAL AND PHYSICAL PROPERTIES---SECTION II

Chemical Name:

nickel salt solution

Formula: proprietary

Hazardous Decomposition Products:

none

Incompatibility (Keep away from):

alkalies and oxidizing agents, direct heat, direct sunlight.

Toxic and Hazardous Ingredients:

nickel sulfamate

CAS #

13770-89-3

Form: liquid

Odor: none

Appearance: clear

Color: green

Specific Gravity (water=1): 1.25

Boiling Point: greater than 100°C (212°F)

Melting Point: not applicable

Solubility in Water (by weight %): 100 at 25°C

Volatile (by weight %): no data available

Evaporation Rate: no data available

Vapor Pressure (mm Hg at 20°C): no data available

Vapor Density (air=1): no data available

pH (as is): 4.0

Stability: Product is stable under normal conditions

Viscosity SUS at 100°F: no data available

FIRE AND EXPLOSION DATA---SECTION III

Special Fire Fighting Procedures:

none

Unusual Fire and Explosion Hazards:

none

Flashpoint: not applicable, water

Flammable limits %: not applicable

Extinguishing agents:

Closed containers exposed to fire may be cooled with water.

(Continued on next page)

W I T C O M A T E R I A L S A F E T Y D A T A S H E E T

SULFAMATE SN

PAGE 2

Product Code: 60001

=====

HEALTH HAZARD DATA---SECTION IV

=====

Permissible concentrations (air):

nickel compounds (soluble): PEL 1mg(Ni)/m³ (OSHA); TLV 0.1 mg(Ni)/m³ (ACGIH)

Chronic effects of overexposure:

nickel compounds: dermatitis(nickel itch); pneumonitis,allergic asthma

Acute toxicological properties:

nickel sulfamate: ipr LDLO = 250 mg/kg (mouse) (NIOSH)

Emergency First Aid Procedures:

Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician.

Skin Contact: Flush with large amounts of water for 15 minutes.

Inhalation: Remove victim to fresh air.

If Swallowed: Contact a physician immediately.

=====

SPECIAL PROTECTION INFORMATION---SECTION V

=====

Ventilation Type Required (Local,mechanical,special):

Local if necessary to maintain allowable PEL(permissible exposure limit) or TLV(threshold limit value)

Respiratory Protection (Specify type):

If the TLV/PEL of the product or any component is exceeded,use an OSHA approved self contained breathing apparatus.

Protective Gloves:

rubber

Eye Protection:

chemical safety goggles and full face shield

Other Protective Equipment:

rubber apron,rubber boots

=====

HANDLING OF SPILLS OR LEAKS---SECTION VI

=====

Procedures for Clean-Up:

Wear protective clothing and equipment during cleanup. Absorb spills on an inert material such as earth, sand or vermiculite; sweep up and dispose of in accordance with federal, state and local regulations.

Waste Disposal:

Dispose of in accordance with all applicable federal, state and local regulations.

=====

SPECIAL PRECAUTIONS---SECTION VII

=====

Precautions to be taken in handling and storage:

Wear protective clothing and equipment while handling.

Do not store near strong oxidizing agents.

Store away from direct heat or sunlight.

(Continued on next page)

W I T C O M A T E R I A L S A F E T Y D A T A S H E E T

SULFAMATE SN

PAGE 3

Product Code: 60001

(Section VII continued)

TRANSPORTATION DATA---SECTION VIII

D.O.T.: Not Regulated

Reportable Quantity: not applicable

Freight Classification: 70 Chemicals Liquid NOS

Special Transportation Notes:

none

COMMENTS---SECTION IX

Do not swallow. Avoid eye and skin contact. Wash thoroughly after handling. Avoid contact with clothing. Wash clothing before reuse. Keep from feed or food products. Keep out of reach of children. Keep containers tightly closed when not in use.

Signature: C. Wilkie

Title: Development Chemist

Original Date:

Sent to:

Revision Date: 09/21/87

Supersedes:

Date Sent:

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

MATERIAL SAFETY DATA SHEET



WORLD HEADQUARTERS
Hach Company
P.O. Box 389 Loveland, Colorado 80539 U.S.A.

HACH EUROPE
BP 51
B5000 NAMUR 1
BELGIUM

1213

I. PRODUCT IDENTIFICATION						
CAT. NO.	1055	TRADE NAME	Sulfamic Acid			
CAS NO.	Not applicable	CHEMICAL NAME	Not applicable			
FORMULA	Not applicable	CHEMICAL FAMILY	Not applicable		EMERGENCY TELEPHONE NO. AMES, IOWA 515-232-2533	
II. HAZARDOUS INGREDIENTS						
INGREDIENT	%	TWA	CAS NUMBER	NATURE of HAZARD	RCRA NO.	Ref.
Sulfamic acid	~ 100		5329-14-6	Causes burns	None	14

III. PHYSICAL DATA			
Solid	xx	Appearance and Odor	Solubility in Water
Liquid		white, crystalline	soluble
Boiling Pt.	Not applicable	Melting Pt.	205°C
Specific Gravity	2.09	pH 5% sol.	= 0.6
Evaporation Rate	Not applicable		Metal Corrosivity
		Not applicable	
Vapor Pressure (mmHg)	Not applicable		
Vapor Density (Air = 1)	Not applicable		

IV. FIRE and EXPLOSION HAZARD DATA			
Flash Point	Not applicable Method Used:		Flammability: Limits
			Lower NA Upper NA
Susceptibility to Spontaneous Heating	None		Shock Sensitivity
			Not determined
			Fire Point
			ND
			Auto Ignition Point
			Not determined
Extinguishing Media:	NA	Water	CO ₂
			Foam
			Dry Chemical
			Other:
Unusual Fire and Explosion Hazards	Could be detonated if heated under confinement.		

V. HEALTH HAZARD DATA													
Acute Toxicity				Ref.		Route of Most Detrimental Exposure				Ref.			
Moderately toxic				7		intraperitoneal and oral routes				3			
	Eyes		Skin		Respiratory Tract		Target Organs for Acute Toxicities						
	Yes	No	Ref.	Yes	No	Ref.	Yes	No	Ref.				
	Corrosive	X	7	X		7	X		7				
	Sensitizing		X	7		X		X	7				
	Irritating		X	7		X		X	7				
Chronic Toxicity				Not determined		Route of Most Detrimental Exposure				contact			
Target Organs				Not determined									
Effects of Overexposure				Not determined									
Long-Term Effects*				Not determined		Ref.		Route of Exposure				Not applicable	
Target Organs				Not applicable									

*The following definitions apply:

Carcinogen: A substance which has the potential to promote malignant growth.

Mutagen: A substance which has the potential to induce genetic changes.

The above terms, when used without a modifier, mean that there is epidemiological evidence that a substance affects man. The following modifiers are used to indicate the type of studies currently reported in literature.


Potential: Some animal studies are positive, some negative or a structural analog of the substance gives positive results in animals.

Experimental: Only one set of data exists and it is positive.

Teratogen: A substance which has the potential to cause defects to progeny.

Tumorigen: A substance which has the potential to induce benign tumors.

VI. PRECAUTIONARY MEASURES

For Customer Use	For International Use
Wash thoroughly after handling. Avoid contact with eyes, skin and clothing. Do not breathe chemicals. Use only with adequate ventilation. Keep away from heat, sparks and open flame.	EEC Cautionary Codes R: 34 S: 7 - 22 - 24/25 - 45 Symbols: C
Protective Equipment safety glasses; lab coat; rubber gloves; adequate ventilation	

Storage Precautions Keep dry and protect from extreme temperatures.

VII. FIRST AID

Call your local Poison Center or Physician first. Have them call:
Hach Company (515)232-2533 (24 Hour Safety Service) or TWX: 910-520-1158

EYE CONTACT: Immediately flush eyes with water for 15 minutes. Call physician.

SKIN CONTACT: Immediately wash skin with soap and plenty of water.

INGESTION: Do not induce vomiting. Give large quantities of water. Give at least 1 ounce of milk of magnesia in an equal amount of water, or the whites of 3 eggs. Never give anything by mouth to an unconscious person. Call physician.

INHALATION: Remove to fresh air.

EEC CODE: S 7 - 26 - 45

VIII. REACTIVITY DATA

Shelf Life up to 12 Mos.	Strong Oxidizer: Yes No XXX	Hazardous Polymerization Possible: Yes No XXX
Hazardous Decomposition Products toxic SO ₂ fumes		
Conditions to Avoid contact with Cl ₂ , fuming HNO ₃ , heat.		

IX. SPILL AND DISPOSAL PROCEDURES

In Case of Spill or Release Eliminate all sources of ignition. Sweep up powder onto dry paper. Cautiously add to cold water in small portions with agitation. Neutralize with 6M NH₄OH in a fume hood and discharge into drain with large excess of water.

Dispose of in accordance with Federal, State and Local regulations. Haz. Waste by Def. §1004(s)90 Stat. 2799

X. TRANSPORTATION REQUIREMENTS

DOM. CLASSIFICATION NCR	PSN:
I.D. NUMBER	
INT. CLASSIFICATION NCR	PSN:
I.D. NUMBER	
Production Hazards IN — PLANT USE ONLY May cause burns to eyes, skin, clothes. Use protective equipment. Do not breathe dust.	<div>Eye/Face Protection (29 CFR) large face shield - PD; safety glasses - PK</div> <div>Protective Gloves rubber gloves - P and P</div> <div>Respiratory Protection dust mask - P and P (29 CFR)</div> <div>Protective Clothing lab coat - P and P</div>

PREPARED BY: Giovanna F. Olson

DATE ISSUED: Nov. 23, 1982 APPROVED: *[Signature]*

REVISION NUMBER: 1

CHG No. C2636

DATE ISSUED: Oct. 18, 1982

SULFURIC ACID

REVISION OF 06/09/86

BELL TELEPHONE LABS
HEALTH/SAFETY MANAGER
IH SB-104
NAPERVILLE-WHEATON ROAD
NAPERVILLE IL 60566

ORDER NO: 691W35866

MCKESSON CHEMICAL COMPANY ONE POST STREET SAN FRANCISCO, CA 94104

-----EMERGENCY ASSISTANCE-----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC
(800) 424-9300.

-----FOR PRODUCT AND SALES INFORMATION-----

CONTACT YOUR LOCAL MCKESSON CHEMICAL COMPANY SERVICE CENTER

-----PRODUCT IDENTIFICATION-----

PRODUCT NAME: ~~SULFURIC ACID~~
COMMON NAMES/SYNONYMS: (SULFURIC ACID;
(OIL OF VITRIOL)

CAS NO.: 7664-93-9
MCKESSON CODE: T1361

FORMULA: H2 S O4
HAZARD RATING (NFPA 704)
HEALTH: 3
FIRE: 0
REACTIVITY: 2
SPECIAL: NO WATER

DATE ISSUED: 05/86
SUPERCEDES: 02/86
HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

-----HAZARDOUS INGREDIENTS-----

		EXPOSURE LIMITS, MG/M3			HAZARD
		OSHA	ACGIH	OTHER	
COMPONENT	%	PEL	TLV	LIMIT	
SULFURIC ACID	77-99	1	1	NONE	CORROSIVE
WATER	BALANCE	NONE	NONE	NONE	NONE

SULFURIC ACID

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-----PHYSICAL PROPERTIES-----

BOILING POINT, DEG F: A=380; VAPOR PRESSURE, MM HG/20 DEG C: A,B,
B=529; C=590 C = NIL
MELTING POINT, DEG F: A=12; B=-20; VAPOR DENSITY (AIR=1): N/A
C=30
SPECIFIC GRAVITY (WATER=1): A=1.71; WATER SOLUBILITY, %:
B=1.83; C=1.84 COMPLETE
APPEARANCE AND ODOR: COLOR- EVAPORATION RATE (BUTYL ACETATE=1): <1
LESS TO PALE YELLOW, OILY
LIQUID. ODORLESS.

A=78% SULFURIC ACID; B=93%(66 BE) SULFURIC ACID; C=99% SULFURIC ACID

-----FIRST AID MEASURES-----

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 30 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY FLUSH SKIN WITH LOTS OF RUNNING WATER FOR 30 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET IMMEDIATE MEDICAL ATTENTION.

IF SWALLOWED: DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LOTS OF WATER OR MILK. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

-----HEALTH HAZARD INFORMATION-----

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: VAPORS AND MISTS ARE EXTREMELY CORROSIVE TO THE NOSE, THROAT, AND MUCOUS MEMBRANES. BRONCHITIS, PULMONARY EDEMA, AND CHEMICAL PNEUMONITIS MAY OCCUR. IRRITATION, COUGHING, CHEST PAIN, AND DIFFICULTY IN BREATHING MAY OCCUR WITH BRIEF EXPOSURE WHILE PROLONGED EXPOSURE MAY RESULT IN MORE SEVERE IRRITATION AND TISSUE DAMAGE.

SULFURIC ACID

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BREATHING HIGH CONCENTRATIONS MAY RESULT IN DEATH.

EYE CONTACT: VAPORS, LIQUID, AND MISTS ARE EXTREMELY CORROSIVE TO THE EYES. BRIEF CONTACT OF THE VAPORS WILL BE SEVERELY IRRITATING. BRIEF CONTACT OF THE LIQUID OR MISTS WILL SEVERELY DAMAGE THE EYES AND PROLONGED CONTACT MAY CAUSE PERMANENT EYE INJURY WHICH MAY BE FOLLOWED BY BLINDNESS.

SKIN CONTACT: VAPORS, MISTS, AND LIQUID ARE EXTREMELY CORROSIVE TO THE SKIN. VAPORS WILL SEVERELY IRRITATE THE SKIN AND LIQUID AND MISTS WILL SEVERELY BURN THE SKIN. PROLONGED LIQUID CONTACT WILL BURN OR DESTROY SURROUNDING TISSUE AND DEATH MAY ACCOMPANY BURNS WHICH EXTEND OVER LARGE PORTIONS OF THE BODY.

SWALLOWED: VAPORS, MISTS, AND LIQUID ARE EXTREMELY CORROSIVE TO THE MOUTH AND THROAT. SWALLOWING THE LIQUID BURNS THE TISSUES, CAUSES SEVERE ABDOMINAL PAIN, NAUSEA, VOMITING, AND COLLAPSE. SWALLOWING LARGE QUANTITIES CAN CAUSE DEATH.

CHRONIC EFFECTS OF EXPOSURE: MAY CAUSE EROSION OF THE TEETH, LESIONS ON THE SKIN, BRONCHIAL IRRITATION, COUGHING, AND PNEUMONIA.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: ACUTE AND CHRONIC RESPIRATORY DISEASES.

-----TOXICITY DATA-----

ORAL: RAT LD50 = 2,140 MG/KG

DERMAL: NO DATA FOUND

INHALATION: GUINEA PIG LC50 = 18 MG/M3

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: NONE

-----PERSONAL PROTECTION-----

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAIN-

SULFURIC ACID

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CONTAINING EMISSIONS AT THE POINT OF USE BELOW THE PEL.

RESPIRATORY PROTECTION: WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THE VAPOR OR MIST CONCENTRATION AT THE POINT OF USE. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ACID GASES/MISTS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES AND FULL FACESHIELD UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: ACID-RESISTANT SLICKER SUIT WITH RUBBER APRON, RUBBER BOOTS WITH PANTS OUTSIDE, AND RUBBER GLOVES WITH GAUNTLETS.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

-----FIRE AND EXPLOSION INFORMATION-----

FLASH POINT, DEG F: NONE

FLAMMABLE LIMITS IN AIR, %

METHOD USED: N/A

LOWER: N/A UPPER: N/A

EXTINGUISHING MEDIA: THIS MATERIAL IS NOT COMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTINGUISH ALL NEARBY SOURCES OF IGNITION SINCE FLAMMABLE HYDROGEN GAS WILL BE LIBERATED FROM CONTACT WITH SOME METALS. KEEP WATER OUT OF CONTAINERS.

-----HAZARDOUS REACTIVITY-----

STABILITY: STABLE

POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE

MATERIALS TO AVOID: ALKALIS, OXIDIZING OR REDUCING MATERIALS, CYANIDES, SULFIDES, OR COMBUSTIBLE MATERIALS. REACTS WITH MANY METALS. CON-

SULFURIC ACID-

REVISION OF: 06/09/86

CENTRATED ACID REACTS VIOLENTLY WITH WATER.

HAZARDOUS DECOMPOSITION PRODUCTS: MAY LIBERATE CARBON MONOXIDE, CARBON DIOXIDE, AND OXIDES OF SULFUR.

-----SPILL, LEAK, AND DISPOSAL PROCEDURES-----

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR ACID-RESISTANT SLICKER SUIT AND COMPLETE PROTECTIVE EQUIPMENT INCLUDING RUBBER GLOVES, RUBBER BOOTS, AND A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR RESPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACE-PIECE AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ACID GASES MAY BE SATISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. REMOVE ALL SOURCES OF IGNITION. FOR SMALL SPILLS OR DRIPS, MOP OR WIPE UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, CONTAIN BY DIKING WITH SOIL OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND CAREFULLY NEUTRALIZE WITH SODA ASH OR LIME. IF SODA ASH IS USED, PROVIDE ADEQUATE VENTILATION TO DISSIPATE THE CARBON DIOXIDE GAS. KEEP NON-NEUTRALIZED MATERIAL OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

-----SPECIAL PRECAUTIONS-----

STORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. VENT CONTAINER CAREFULLY, AS NEEDED, TO RELIEVE PRESSURE. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. DO NOT USE PRESSURE TO EMPTY CONTAINER. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL ON OR NEAR THIS CONTAINER.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL

SULFONIC ACID

REVISION OF 06/09/86

RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND
HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

-----FOR ADDITIONAL INFORMATION-----

CONTACT DOUGLAS EISNER, TECHNICAL DIRECTOR, MCKESSON CHEMICAL COMPANY
DURING BUSINESS HOURS, PACIFIC TIME (415)983-9214

-----NOTICE-----

ALL INFORMATION, RECOMMENDATIONS, AND SUGGESTIONS APPEARING HEREIN
CONCERNING THIS PRODUCT ARE BASED UPON DATA OBTAINED FROM THE
MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES; HOWEVER, MCKESSON
CHEMICAL COMPANY ("MCC") MAKES NO WARRANTY, REPRESENTATION OR GUARANTY
AS TO THE ACCURACY, SUFFICIENCY OR COMPLETENESS OF THE MATERIAL SET
FORTH HEREIN. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SAFETY,
TOXICITY AND SUITABILITY OF HIS OWN USE, HANDLING AND DISPOSAL OF THE
PRODUCT. ADDITIONAL PRODUCT LITERATURE MAY BE AVAILABLE UPON REQUEST.
SINCE ACTUAL USE BY OTHERS IS BEYOND OUR CONTROL, NO WARRANTY, EXPRESS
OR IMPLIED, IS MADE BY MCC AS TO THE EFFECTS OF SUCH USE, THE RESULTS TO
BE OBTAINED OR THE SAFETY AND TOXICITY OF THE PRODUCT, NOR DOES MCC
ASSUME ANY LIABILITY ARISING OUT OF USE BY OTHERS OF THE PRODUCT
REFERRED TO HEREIN. THE DATA IN THIS MSDS RELATE ONLY TO THE SPECIFIC
MATERIAL DESIGNATED HEREIN AND DO NOT RELATE TO USE IN COMBINATION WITH
ANY OTHER MATERIAL OR IN ANY PROCESS.

-----REVISION-----

0000002

05/86: CORRECTED MELTING POINTS. REVISED RESPIRATORY AND EYE PRO-
TECTION AND FIRE FIGHTERS CLOTHING. EXPANDED UNUSUAL FIRE HAZARDS AND
MATERIALS TO AVOID. REVISED SPILL/LEAK PROCEDURES AND HANDLING ADVICE.

END OF MSDS



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I . IDENTIFICATION OF PRODUCT

CHEMICAL NAME
Sulfuric Acid

FORMULA
 H_2SO_4

SYNONYM OR CROSS REFERENCE
(Oil of Vitriol, Oleum)

CAS NO: 7664-93-9

SECTION II . HAZARDOUS INGREDIENTS

MATERIAL

NATURE OF HAZARD

SECTION III . PHYSICAL DATA

BOILING POINT

MELTING POINT
-34 to -21°F.

VAPOR PRESSURE
Low

SPECIFIC GRAVITY
1.56-1.84

VAPOR DENSITY (AIR=1)
3.40

PERCENT VOLATILE BY VOLUME (%)

WATER SOLUBILITY
Complete

EVAPORATION RATE
(_____ = 1)

APPEARANCE
Oily liquid

SECTION IV . FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)

FLAMMABLE LIMITS

Lower

Upper

FIRE EXTINGUISHING MEDIA
Suitable dry chemical

SPECIAL FIRE-FIGHTING PROCEDURES Do not use water to put out fire if the water can get into concentrated sulfuric acid. In case of fire next to sulfuric acid tank, use respiratory protection against fumes.

UNUSUAL FIRE AND EXPLOSION HAZARD Reacts violently with water and organic materials with evolution of heat.

SECTION V . HEALTH HAZARD

THRESHOLD LIMIT VALUE
1 mg/M³ orl-rat LD50: 2140 mg/kg

HEALTH HAZARDS
Causes severe burns.

FIRST AID PROCEDURES In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. If swallowed, do not give emetics; if conscious, give tap water, milk, or milk of magnesia. Call a physician.

CHEMICAL NAME

SECTION VI . REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Avoid adding water to the acids since large amount of heat is produced.
	STABLE	X	

INCOMPATABILITY (materials to avoid)

Highly corrosive. May set fire to wood or cellulose.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII . SPILL AND DISPOSAL PROCEDURES

SPILLS

Cover the contaminated surface with sodium bicarbonate or a soda ash-slaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry. Alternatively use J.T.Baker's Neutrasorb[®] (Product No. 4456).

DISPOSAL

Dispose through a waste treatment plant if local environmental regulations permit.

SECTION VIII . PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Self-contained breathing apparatus.

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER
PROTECTIVE GLOVES Rubber gloves	EYE PROTECTION	

OTHER PROTECTIVE EQUIPMENT

Approved working clothes (have a body shield available) and rubber boots.

SECTION IX . HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Do not allow water to get into container because of violent reaction.
Keep in tightly closed container. Loosen closure cautiously.

SECTION X . MISCELLANEOUS INFORMATION

Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Wash thoroughly after handling.

Date issued: 10/15/82

Approved by R. M. Mitchell
Manager, Quality Assurance

Revision No. & Date issued:

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary. We reserve the right to revise Material Safety Data Sheets from time to time as new technical information becomes available. The user has the responsibility to contact the company to make sure that the sheet is the latest one issued.

PRODUCT NAME: SUPER SOLDER STRIP 3807

J & S LABORATORIES, INC.
49 Pelham Road Salem, NH 03079
(603) 893-8700 (213) 830-1412 (417)
831-5463

EMTREC EMERGENCY TELEPHONE: 800-424-9300

EFFECTIVE DATE: 1 June 1986

I. INGREDIENTS:

COMPONENT(S):	CAS NO.	EXPOSURE LIMITS TO AIR			OTHER
		ACGIH TLV	OSHA PEL		
Inorganic Fluoride	TRADE SECRET	2.5 mg(F)/m ³	2.5 mg(F)/m ³		NA
Hydrogen Peroxide	7722-84-1	NA	NA		NA

Chemical identity is being withheld as a trade secret pursuant to NH RSA 277A. Have submitted confidential information to CA OSHA pursuant to Section 5194, Hazard Communication, Subsection (i), Trade Secrets.

II. PHYSICAL DATA:

MELTING POINT: -10°F
BOILING Point: 200°F
VAPOR PRESSURE (mm Hg): NA
VAPOR DENSITY (Air=1): NA
ODOR: Odorless
APPEARANCE: Clear solution

SPECIFIC GRAVITY: 1.05-1.10
SOLUBILITY IN WATER: infinite
EVAPORATION RATE (BuAc=1): NA
PH: 2.0-4.0

III. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: Non-flammable.
METHOD USED: Closed Cup Pending
AUTOIGNITION TEMPERATURE: NA
FLAMMABLE LIMITS: UPPER: NA LOWER: NA
EXTINGUISHING MEDIA: Water spray. Water fog.

FIRE AND EXPLOSION HAZARDS:

Dangerous when heated, dangerous by chemical reaction with flammable materials.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear goggles and self-contained breathing apparatus. Use water to keep fire-exposed containers cool and to flush spills away from fire.

IV. REACTIVITY:

STABILITY: Stable

MATERIAL SAFETY DATA SHEET

MASS DPH TRADE SECRET NO.: 99-003-075

PRODUCT NAME: SUPER SOLDER STRIP 3807

J & S LABORATORIES, INC.

49 Pelham Road Salem, NH 03079

(603) 893-8700 (213) 830-1412 (417)

831-5463

CONDITIONS TO AVOID:

Heat. Contamination.

HAZARDOUS POLYMERIZATION:

Will Not Occur

POLYMERIZATION AVOID:

None

INCOMPATIBILITY:

Strong oxidizing and reducing agents. Combustible materials. Organics.

HAZARDOUS DECOMPOSITION PRODUCTS:

Organic compounds on combustion. Contamination causes decomposition, releasing O_2 , increasing the pressure in the container. When heated, releases toxic fumes of HF , F^- and NO_x . NH_3 .

V. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS

CAUTION:

Use appropriate protective and safety equipment.

SMALL SPILL:

Slowly neutralize with dilute soda ash or lime. If soda ash is used, provide adequate ventilation to dissipate the carbon dioxide gas.

LARGE SPILL:

Contain by diking with an absorbent inorganic material. Prevent runoff from entering sewers, storm drains, surface water, and soil. Slowly neutralize with dilute soda ash or lime. If soda ash is used, provide adequate ventilation to dissipate the carbon dioxide gas. Transfer neutralized solution to a DOT-approved container.

WASTE DISPOSAL INFORMATION:

Dumping into sewers, on the ground, or into any body of water is strongly discouraged and is illegal. Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

NOTE:

Comply with all applicable government regulations on spill reporting and handling and disposal of waste. NOTE: Empty containers can have residues, gases, and mists, and are subject to proper waste disposal.

I. HEALTH HAZARD DATA:

PRODUCT NAME: SUPER SOLDER STRIP 3807
J & S LABORATORIES, INC.
49 Pelham Road Salem, NH 03079
(603) 893-8700 (213) 830-1412 (417)
831-5463

BREATHED:

Exposure to vapors and mists severely irritate nose and throat. Temporary lung irritation may be accompanied with cough, discomfort, difficulty breathing, or shortness of breath at higher exposure.

SKIN CONTACT:

Brief exposure causes skin irritation with discomfort or rash. Longer exposures may cause blisters or burns.

SKIN ABSORPTION:

Components are unlikely to be absorbed through skin in harmful concentrations.

EYE CONTACT:

Vapors cause slight to moderate irritation with discomfort, tearing, or blurred vision, depending on the concentration. Mists and liquids will irritate and may burn the eye. The corrosive effect of a component(s) may be delayed.

SWALLOWED:

A component(s) of this product is toxic. The liquid is severely irritating to the mouth and throat. Swallowing the liquid may cause a sudden evolution of oxygen, which can cause injury by stretching the esophagus or stomach, local internal bleeding may result.

SYSTEMIC AND OTHER EFFECTS:

If a chronic effect has not been mentioned under a route of entry, no chronic effects are known to result from exposure to components of this product.

MEDICAL CONDITIONS AGGRAVATED:

No medical conditions are known to be aggravated by exposure to this product.

SUSPECTED CANCER AGENT: No

FEDERAL OSHA	CA OSHA	NTP	IARC
No	No	No	No

TARGET ORGANS, OTHER THAN THOSE IMPLIED BY ROUTES OF ENTRY (I.E., BREATHED, INCLUDES RESPIRATORY TRACT AND LUNGS) ARE CAPITALIZED.

VII. FIRST AID:

BREATHED:

MATERIAL SAFETY DATA SHEET

MASS DPH TRADE SECRET NO.: 99-003-075

PRODUCT NAME: SUPER SOLDER STRIP 3807

J & S LABORATORIES, INC.

49 Pelham Road Salem, NH 03079

(603) 893-8700 (213) 830-1412 (417) 831-5463

Remove victim to fresh air at once. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Keep victim warm and at rest. **GET IMMEDIATE MEDICAL ATTENTION.**

SKIN:

Wash skin immediately with lots of soap and water. If clothes and shoes are contaminated, remove and wash before reuse. Get medical attention if ill effect or irritation develops.

EYES:

Wash eyes immediately with running water for at least 30 minutes. Use fingers to assure that eyelids are separated and that eye is being washed. Lift the lower and upper lid occasionally. **GET IMMEDIATE MEDICAL ATTENTION.**

SWALLOWED:

DO NOT INDUCE VOMITING. If vomiting spontaneously occurs, do not allow vomitus to be breathed into lungs. Keep victim's head below his hips. Call a physician and/or transport to emergency medical facility immediately. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Corrosive: May cause stricture.

NOTE TO PHYSICIAN:

Supportive care: Treatment based on judgement of physician in response to reactions of patient. If swallowed, large amounts of oxygen may be released quickly. The distention of the stomach or esophagus may be injurious. Insertion of a gastric tube may be advisable.

VIII. HANDLING PRECAUTIONS:

VENTILATION:

Control airborne concentrations below exposure guidelines (Section I) with **MECHANICAL VENTILATION**, if necessary. Have adequate ventilation when using product. Local **EXHAUST VENTILATION** may be necessary for some operations.

RESPIRATORY PROTECTION:

Use NIOSH-approved cannister respirator in absence of adequate environmental controls at the point of use.

EYE PROTECTION:

Contact lenses should not be used. Suggested protection is safety glasses, but where contact with liquid is likely, chemical goggles or face shields are recommended.

PRODUCT NAME: SUPER SOLDER STRIP 3807

J & S LABORATORIES, INC.

49 Pelham Road Salem, NH 03079

(603) 893-8700 (213) 830-1412 (417)

831-5463

SKIN PROTECTION:

Adequate personal protection is essential for all industrial concentrations of peroxide. Polyester or acrylic full-body covering clothing are recommended as are rubber or neoprene boots and gloves, and hard hat with brim. DO NOT WEAR leather shoes or shoes that are cracked, suede or other porous materials. Wash thoroughly after handling chemicals.

SPECIAL EQUIPMENT:

Suitable laboratory equipment would include safety showers and eye washes.

IX. STORAGE AND HANDLING:

Train all employees on all special handling procedures in this section before they work with this product. Exercise reasonable care and caution. Personnel should avoid breathing vapors and/or mists and getting product in the eyes or on the skin. DO NOT CONSUME food, drink, or tobacco in areas where they may become contaminated with this material. Keep containers cool, dry, and away from sources of ignition. DO NOT STORE product in direct sunlight, high temperature, or below freezing areas. If separation occurs, warm and stir until solids redissolve. Keep product container tightly closed when not in use. Protect containers from physical damage. Use and store with adequate ventilation. Wash thoroughly after using. DO NOT PRESSURE product out of vessel or force product from container with air. Vent container frequently, and more often in warm weather, to relieve pressure. Do not use glass or porcelain as materials of construction. Never return unused peroxide to original container. Never add another product to container.

X. OTHER PRECAUTIONS:

None Abbreviations: NA - Not Available

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH, BUT NO WARRANTY, EXPRESS OR IMPLIED, IS MADE. FOR FURTHER INFORMATION, CALL (603) 893-8700.

MAR

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MACALASTER BICKNELL CO. OF NJ, INC.

4754

Mallinckrodt

TETRACHLOROETHYLENEMaterial Safety Data Sheet

Mallinckrodt Inc.
Science Products Division
P.O. Box M
Paris, Kentucky 40361

Emergency Telephone Number
314-982-5000

Effective Date: 10-16-85

PRODUCT IDENTIFICATION:

Synonyms: (tetrachloride ethylene; tetrachloroethene)

Formula CAS No.: 127-18-4

Molecular Weight: 165.83

Hazardous Ingredients:
None.Chemical Formula: C₂Cl₄PRECAUTIONARY MEASURES

**WARNING! HARMFUL IF SWALLOWED OR INHALED.
CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
AFFECTS CENTRAL NERVOUS SYSTEM.**

Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

EMERGENCY/FIRST AID

If swallowed, induce vomiting immediately by giving two glasses of water, or milk if available and sticking finger down throat. Never give anything by mouth to an unconscious person.
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.
In all cases call a physician.
SEE SECTION 5.

DOT Hazard Class: Poison-A

Physical DataSECTION 1

Appearance: Clear, colorless liquid.

Odor: Ethereal.

Solubility: 0.015 g in 100 g of water.

Boiling Point: 119-121°C (246-250°F)

Melting Point: -22°C (-8°F)

Density: 1.63

Vapor Density (Air=1): 5.83

Vapor Pressure (mm Hg): 16 at 22°C (72°F)

Evaporation Rate: (CCl₄
25V-1) 0.27Fire and Explosion InformationSECTION 2

Fire:

Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive).

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Reactivity DataSECTION 3

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

This substance does not polymerize.

Incompatibilities:

Strong oxidizers, strong alkalis, especially NaOH; finely divided metals, especially zinc.

Leak/Spill Disposal InformationSECTION 4

Clean-up personnel require protective clothing and respiratory protection from vapors. Contain and recover liquid when possible. Chlorinated solvents in large amounts should be burned in an approved incinerator with appropriate scrubbers. Alternatively, absorb with vermiculite, dry sand, earth, or similar material. Scoop up with non-sparking tools and place in a closed container, and dispose in a RCRA approved facility. Do not flush to the sewer.

Reportable Quantity (RQ) (CWA/CERCLA) : 1 lb.

Ensure compliance with local, state and federal regulations.

Health Hazard InformationSECTION 5A. Exposure/Health Effects

- Inhalation:** Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest and death. Concentrations of 600 ppm and more may effect the central nervous system after a few minutes.
- Ingestion:** Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). May cause abdominal pain, nausea, diarrhea, headache, and dizziness.
- Skin Contact:** Prolonged or repeated contact may produce irritation or dermatitis due to defatting the skin. Soreness or skin flaking can occur.
- Eye Contact:** Pain and tearing will be experienced after contact with the liquid solvent or strong concentrations of vapors.
- Chronic Exposure:** May cause liver, kidney or central nervous system damage after repeated or prolonged exposures.
- Aggravation of Pre-existing Conditions:** Persons with pre-existing skin disorders or eye problems or impaired kidney function may be more susceptible to the effects of the substance. Use of alcoholic beverages enhances the toxic effects of exposure.

B. FIRST AID

- Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
- Ingestion:** If swallowed, induce vomiting immediately by giving two glasses of water, or milk if available and sticking finger down throat. Call a physician immediately. Never give anything by mouth to an unconscious person.
- Skin Exposure:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.
- Eye Exposure:** Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY DATA (RTECS, 1982)

Oral rat LD50: 8850 mg/kg.
 Oral mouse LD50: 8100 mg/kg.
 Irritation data: Skin rabbit: 810 mg/24H Severe.
 Eye rabbit: 162 mg Mild.
 Tumorigenic effects cited.
 Mutation references cited.
 Reproductive effects cited.
 Aquatic toxicity rating: Tlm96: 100-10 ppm.
 Carcinogenic Determination: Limited evidence in animals. Category III - cannot be classified as to its carcinogenicity in humans. (IARC Supp. 4, 1982).

Occupational Control MeasuresSECTION 6

- Airborne Exposure Limits:**
- OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) 200 ppm ceiling
300/5M/3H peak.
 - ACGIH Threshold Limit Value (TLV):
50 ppm (TWA)
200 ppm (STEL)
- Ventilation System:** A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of into the general work area. Please refer to the ACGI document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.
- Personal Respirators (NIOSH Approved)** If the TLV is exceeded a full facepiece chemical cartridge respirator may be worn, in general, up to times the TLV or the maximum use concentration specified by the respirator supplier, whichever is less. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.
- Skin Protection:** Wear protective gloves and clean body-covering clothing.
- Eye Protection:** Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.
- Storage and Special Information** SECTION 7
- Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight.

 The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, Mallinckrodt, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, Mallinckrodt, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. NO REPRESENTATIONS, OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS.

MATERIAL SAFETY DATA SHEET

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PI 0687

SECTION I

PRODUCT NAME Tetramethylammonium Hydroxide (25% in methanol) SIZE 100 g & 500 g

CHEMICAL NAME N,N,N-Trimethylmethanaminium Hydroxide

FORMULA (CH₃)₄NOH

MANUFACTURER EASTMAN KODAK COMPANY

ADDRESS 343 STATE STREET, ROCHESTER, NEW YORK 14650

FOR INFORMATION ON HEALTH HAZARDS CALL (716) 458-1000 Ext. 85566

FOR OTHER INFORMATION CALL (716) 722-2121

INFORMATION EFFECTIVE AS OF 5/7/79

SECTION II HAZARDOUS INGREDIENTS OF MIXTURES

PRINCIPAL HAZARDOUS COMPONENT(S)	%	TLV (Units) *
<u>Tetramethylammonium Hydroxide</u>	<u>25 (wt)</u>	<u>----</u>
<u>Methanol</u>	<u>75 (wt)</u>	<u>200ppm</u>
		<u>*ACGIH, 1978</u>

SECTION III PHYSICAL DATA

BOILING POINT (°F) 148°F (64°C) (methanol) SPECIFIC GRAVITY (H₂O=1) 0.792 (methanol)

VAPOR PRESSURE (mm Hg) 100 @ 20°C (methanol) PERCENT VOLATILE BY VOLUME (%) 75 (methanol)

VAPOR DENSITY (AIR=1) 1.1 (methanol) EVAPORATION RATE (=1) ----

SOLUBILITY IN WATER Complete (methanol)

APPEARANCE AND ODOR Light yellow liquid; methanol odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used) 50°F (10°C) TCC (methanol) FLAMMABLE LIMITS For methanol Lel 6.6% Uel 36.5%

EXTINGUISHING MEDIA CO₂, dry chemical, water

SPECIAL FIRE-FIGHTING PROCEDURES Air mask should be worn

UNUSUAL FIRE AND EXPLOSION HAZARDS None

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -----

EFFECTS OF OVEREXPOSURE INHALATION: High vapor concentrations may cause irritation of respiratory tract narcosis, and various degrees of visual impairment. EYES: Contact with liquid causes irritation and/or burns. SKIN: Prolonged or repeated contact may cause irritation or burns. Toxic amounts may be absorbed through the skin.

EMERGENCY AND FIRST-AID PROCEDURES

INHALATION: Remove to fresh air. Get medical attention. EYES: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention. SKIN: Immediately flush with plenty of water. Remove contaminated clothing and shoes.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID
	STABLE X	

COMPATIBILITY
(Materials to avoid)

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS Thermal decomposition or burning may produce carbon monoxide and/or carbon dioxide

HAZARDOUS POLYMERIZATION CONDITIONS TO AVOID

May Occur	Will Not Occur
	X

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all sources of ignition. Wearing suitable protective clothing, absorb spilled material on vermiculite. Place in fiber carton. Incinerate. Wash spill area well with soap and water.

WASTE DISPOSAL METHOD

Wearing suitable protective clothing, incinerate. State and local laws take precedence.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

(Specify Type) An approved organic vapor respirator if ventilation is inadequate

VENTILATION	LOCAL EXHAUST If necessary	SPECIAL No
	MECHANICAL (general) Yes	OTHER No

PROTECTIVE GLOVES

Yes

EYE PROTECTION

Yes

OTHER

PROTECTIVE EQUIPMENT

As necessary to prevent skin contact

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Keep container closed. Keep away from heat, sparks and open flame.

OTHER PRECAUTIONS

Ingestion: May be fatal or cause blindness if swallowed. If swallowed, do not induce vomiting. Give 1-2 glasses of milk and call a physician immediately.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME OLIVER SALES COMPANY INCORPORATED		EMERGENCY TELEPHONE NO. (214) 231-1522
ADDRESS (Number, Street, City, State, and ZIP Code) 13445 Floyd Circle Dallas, TX 75243		
CHEMICAL NAME AND SYNONYMS N/A		TRADE NAME AND SYNONYMS TFE Mold Release
CHEMICAL FAMILY Aerosol Coating	FORMULA COMPOUND PRODUCT	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
PROPELLENT (PROPANE/ISOBUTANE) CAS #(74-98-6 & 106-97-8)				15	1000ppm
111 - TRICHLOROETHANE CAS #(71-55-6)				30	350ppm
SPECIAL ADDATIVE (TRADE SECRET)				5	N/A

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	120°F	SPECIFIC GRAVITY (H₂O=1)	1.625
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT, VOLATILE BY VOLUME (%)	95
VAPOR DENSITY (AIR=1)	HEAVIER THAN AIR	EVAPORATION RATE (ETHER = 1)	SLOWER THAN ETHER
SOLUBILITY IN WATER	NEGLIGABLE		
APPEARANCE AND ODOR	LIQUID; WHITE; OPAQUE; SLIGHTLY VISCOUS; SLIGHT ODOR		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 21, NO BACKFLASH	FLASH PER FIFRA FLAME EXTENSION	FLAMMABLE LIMITS	LM N/A	UM N/A
EXTINGUISHING MEDIA CO ₂ , DRY CHEMICAL				
SPECIAL FIRE FIGHTING PROCEDURES NONE				
UNUSUAL FIRE AND EXPLOSION HAZARDS SEE SECTION IX				

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE NOT ESTABLISHED

EFFECTS OF OVEREXPOSURE

SKIN: MILD SKIN IRRITATION

INHILATION: DIZZINESS & NAUSEA

EMERGENCY AND FIRST AID PROCEDURES

SKIN: WASH SKIN WITH SOAP & WATER

INHILATION: REMOVE PATIENT TO FRESH AIR

EYE CONTACT: FLUSH EYES W/ PLENTY OF WATER,
CONTACT PHYSICIAN.**SECTION VI - REACTIVITY DATA****STABILITY**

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

N/A

INCOMPATIBILITY (Materials to avoid)

AVOID WELDING ARCS AND VERY HOT SURFACES.

HAZARDOUS DECOMPOSITION PRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE

**HAZARDOUS
POLYMERIZATION**

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

N/A

SECTION VII - SPILL OR LEAK PROCEDURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**ISOLATE SPILL, COLLECT WITH ABSORBANT MATERIAL, PLACE INTO CONTAINER.
PLACE CONTAINER OF CONTAMINATED ABSORBANT MATERIAL OUT DOORS, ALLOW
VOLITILES TO EVAPORATE, THEN DISPOSE OF REMAINS IN REGULAR FASHION**WASTE DISPOSAL METHOD**

SEE ABOVE.

SECTION VIII - SPECIAL PROTECTION INFORMATION**RESPIRATORY PROTECTION (Specify type)** NOT REQUIRED**VENTILATION**

LOCAL EXHAUST

USE IN WELL VENTILATED AREA

SPECIAL N/A

MECHANICAL (General)

N/A

OTHER N/A

PROTECTIVE GLOVES

NOT REQUIRED

EYE PROTECTION

AVOID SPRAYING IN EYES.

OTHER PROTECTIVE EQUIPMENT

NONE

SECTION IX - SPECIAL PRECAUTIONS**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING**STORE AWAY FROM CHILDREN. DO NOT EXPOSE CONTAINER TO DIRECT SUNLIGHT
OR TO TEMPERATURES ABOVE 120°F.**OTHER PRECAUTIONS**

2450
CODE: 430-061-00

HARSHAW/FILTROL

MATERIAL SAFETY DATA SHEET

PRODUCT NAME

Tin Fluoborate Solution
FLUOPURE

FEB 10 1988

H-33-84-WP

DATE: 01/11/88

SECTION I -- IDENTIFICATION

SUPPLIER'S NAME Harshaw/Filtrol PartnershipEMERGENCY TELEPHONE 216/292-9200ADDRESS 30100 Chagrin Blvd.
Cleveland, Ohio 44124CHEMICAL NAME Tin FluoborateCAS No. 13814-97-6U.N. No. UN 1760FORMULA Sn[BF(4)](2)D.O.T. CLASSIFICATION Corrosive Material

SECTION II -- HAZARDOUS INGREDIENTS

<u>Material or Component</u>	<u>%</u>	<u>THRESHOLD LIMIT VALUE</u>	
		<u>ACGIH, 1987-88</u>	<u>OSHA PEL</u>
Tin Fluoborate [13814-97-6-]	≈50	2 mg/m ³ as Sn	2 mg/m ³ as Sn

Unless otherwise noted, all values are reported as 8-hr Time-Weighted Averages (TWA's) and total dust (particulates only).

SECTION III -- PHYSICAL DATA

BOILING POINT Not availableMELTING POINT Not applicableSPECIFIC GRAVITY (H₂O=1) 1.60VAPOR PRESSURE Not applicableVAPOR DENSITY (Air=1) Not applicableSOLUBILITY IN H₂O (% by Wt.) Miscible% VOLATILES BY VOLUME Not applicableEVAPORATION RATE
Not applicableAPPEARANCE AND ODOR Clear, colorless, odorless liquid

SECTION IV -- FIRE AND EXPLOSION DATA

Not a fire or explosion hazard.

SECTION V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV)/ PERMISSIBLE EXPOSURE LIMIT (PEL)

See Section II above.

EFFECTS OF OVEREXPOSUREEye contact causes severe burns.Skin contact causes burns.Inhalation is severely irritating to the respiratory tract and can cause burning sensation, severe coughing, wheezing, aggravation of bronchitis and asthma.Ingestion causes severe burns and extensive tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.Note: Use good industrial hygiene practice.Note: May aggravate existing respiratory and/or skin ailments.Note: Not listed as a carcinogen by NTP, IARC or regulated by OSHA.

EMERGENCY AND FIRST AID PROCEDURES

Eye and Skin contact: Immediately flush eyes and skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Destroy contaminated shoes.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Antidote: If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Call a physician immediately. Never give anything by mouth to an unconscious person.

===== DATE: 01/11/88 ===== SECTION VI -- REACTIVITY DATA ===== CODE: 430-061-00 =====

CONDITIONS CONTRIBUTING TO INSTABILITY None expected

INCOMPATIBILITY Alkalies

HAZARDOUS DECOMPOSITION PRODUCTS None expected

===== SECTION VII -- SPILL OR LEAK PROCEDURES =====

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Contain spillage and neutralize by smothering with excess lime or soda ash; scoop into container for disposal. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean-up of spills, including reuse or disposal as appropriate (see waste disposal method, below).

WASTE DISPOSAL METHOD Federal, state and local disposal laws and regulations will determine the proper waste disposal procedure. All waste materials should be reviewed to determine the applicable hazards (testing may be necessary). Any waste solution with a pH of ≤ 2 or ≥ 12.5 is considered a hazardous waste under EPA hazardous waste regulations.

Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected. Some waste materials are amenable to recycle/reuse.

===== SECTION VIII -- PROTECTIVE EQUIPMENT =====

VENTILATION General; local exhaust ventilation as necessary to control any air contaminants, to within their TLV's, in the use of this product.

PERSONAL PROTECTIVE EQUIPMENT

Chemical goggles; full face shield.
Protective clothing; neoprene gloves, boots,
apron or acid-resistant rubber suit, hat.
A NIOSH/MSHA approved respirator as necessary

===== SECTION IX -- SPECIAL PRECAUTIONS =====

Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep container closed.

SECTION X -- PERSONNEL SAMPLING PROCEDURE

For tin compounds: Refer to NIOSH Manual of Analytical Methods, 2nd Edition, Volume 3, April 1977, P&CAM, S183.

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

DATE: 01/11/88

CODE: 430-061-00

PRODUCT: Tin Fluoborate Solution FLUOPURE

9408

CODE: 430-034-00

MAY 20 1988

HARSHAW/FILTROL

MATERIAL SAFETY DATA SHEET

PRODUCT NAME
Tin Fluoborate Solution
ELECTROPURE

DATE: 01/13/88

H-33-84-WP

SECTION I -- IDENTIFICATION

SUPPLIER'S NAME Harshaw/Filtrol Partnership
ADDRESS 30100 Chagrin Blvd.
Cleveland, Ohio 44124
EMERGENCY TELEPHONE 216/292-9200
CHEMICAL NAME Tin Fluoborate

CAS No. 13814-97-6

U.N. No. UN 1760

FORMULA $\text{Sn}[\text{BF}(4)](2)$

D.O.T. CLASSIFICATION Corrosive Liquid

SECTION II -- HAZARDOUS INGREDIENTS

Material or Component	%	THRESHOLD LIMIT VALUE	
		ACGIH, 1987-88	OSHA PEL
Tin Fluoborate [13814-97-6]	≈50	2mg/m ³ as Sn	2 mg/m ³ as Sn

Unless otherwise noted, all values are reported as 8-hr Time-Weighted Averages (TWA's) and total dust (particulates only).

SECTION III -- PHYSICAL DATA

BOILING POINT	Not available	MELTING POINT	Not applicable
SPECIFIC GRAVITY (H ₂ O=1)	1.60	VAPOR PRESSURE	Not applicable
VAPOR DENSITY (Air=1)	Not applicable	SOLUBILITY IN H ₂ O (% by Wt.)	Miscible
% VOLATILES BY VOLUME	Not applicable	EVAPORATION RATE	Not applicable
APPEARANCE AND ODOR	Clear, colorless; odorless liquid		

SECTION IV -- FIRE AND EXPLOSION DATA

Not a fire or explosion hazard.

SECTION V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV)/ PERMISSIBLE EXPOSURE LIMIT (PEL)
See Section II above

EFFECTS OF OVEREXPOSURE

Eye contact causes severe burns.

Skin contact causes burns.

Inhalation is severely irritating to the respiratory tract and can cause burning sensation, severe coughing, wheezing, aggravation of bronchitis and asthma.

Ingestion causes severe burns and extensive tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

Note: Use good industrial hygiene practice.

Note: May aggravate existing respiratory and/or skin ailments.

Note: Not listed as a carcinogen by NTP, IARC or regulated by OSHA.

EMERGENCY AND FIRST AID PROCEDURES

Eye and Skin contact: Immediately flush eyes and skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Destroy contaminated shoes.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Antidote: If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Call a physician immediately. Never give anything by mouth to an unconscious person.

== DATE: 01/13/88 == SECTION VI -- REACTIVITY DATA == CODE: 430-034-00 ==

CONDITIONS CONTRIBUTING TO INSTABILITY None expected

INCOMPATIBILITY Alkalies

HAZARDOUS DECOMPOSITION PRODUCTS None expected

== SECTION VII -- SPILL OR LEAK PROCEDURES ==

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Contain spillage and neutralize by smothering with excess lime or soda ash; scoop into container for disposal. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean-up of spills, including reuse or disposal as appropriate (see waste disposal method, below).

WASTE DISPOSAL METHOD Federal, state and local disposal laws and regulations will determine the proper waste disposal procedure. All waste materials should be reviewed to determine the applicable hazards (testing may be necessary). Any waste solution with a pH of ≤ 2 or ≥ 12.5 is considered a hazardous waste under EPA hazardous waste regulations.

Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected. Some waste materials are amenable to recycle/reuse.

== SECTION VIII -- PROTECTIVE EQUIPMENT ==

VENTILATION General; local exhaust ventilation as necessary to control any air contaminants, to within their TLV's, in the use of this product.

PERSONAL PROTECTIVE EQUIPMENT Chemical goggles; full face shield.
Protective clothing; neoprene gloves, boots,
apron or acid-resistant rubber suit, hat.
A NIOSH/MSHA approved respirator as necessary

== SECTION IX -- SPECIAL PRECAUTIONS ==

Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep container closed.

SECTION X -- PERSONNEL SAMPLING PROCEDURE

For tin compounds: Refer to NIOSH Manual of Analytical Methods, 2nd Edition, Volume 3, April 1977, P&CAM, S183.

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DATE: 01/13/88

CODE: 430-034-00

PRODUCT: Tin Fluoborate Solution ELECTROPURE



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Toluene	FORMULA $C_6H_5CH_3$
SYNONYM OR CROSS REFERENCE (Toluol Methacide Methylbenzene Phenylmethane)	CAS NO: 108-88-3

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD
----------	------------------

SECTION III. PHYSICAL DATA

BOILING POINT 111°C.	MELTING POINT -95°C.
VAPOR PRESSURE 36.7 mmHg at 30°C.	SPECIFIC GRAVITY 0.87
VAPOR DENSITY (AIR=1) 3.14	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Insoluble	EVAPORATION RATE (_____ = 1)

APPEARANCE
Colorless, refractive liquid with benzene-like odor.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) 40°F. (closed cup)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA Water spray, carbon dioxide, dry chemical, foam.			
SPECIAL FIRE-FIGHTING PROCEDURES			

UNUSUAL FIRE AND EXPLOSION HAZARD
Flammable liquid

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE

200 ppm ipr-rat LD₅₀: 1640 mg/kg orl-rat LD₅₀: 7.53 ml/kg 47

HEALTH HAZARDS

Harmful if inhaled or swallowed. Causes eye irritation.

FIRST AID PROCEDURES If inhaled, remove to fresh air. Administer artificial respiration or oxygen as necessary. Call a physician. If swallowed, do not induce vomiting; if conscious, cautiously give warm water, then mineral oil followed by hot coffee or tea. Call a physician. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water.

CHEMICAL NAME

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Heat, sparks, and flame
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES**SPILLS**

Eliminate all sources of ignition and flammables. Absorb spill on sand, earth or vermiculite. Carefully sweep up and remove. Allow to evaporate. Flush spill area with water. Alternatively use J. T. Baker Flammable Liquid Spill Kit.

DISPOSAL

Atomize into an incinerator providing environmental regulations permit. Combustion may be improved by mixing with a more flammable solvent.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

All-purpose canister mask available.

VENTILATION	LOCAL	SPECIAL
	Preferable	
	MECHANICAL (general)	OTHER

PROTECTIVE GLOVES
Rubber glovesEYE PROTECTION
Safety glasses; face shield

OTHER PROTECTIVE EQUIPMENT

Approved working clothes; eyebath

SECTION IX. HANDLING AND STORAGE PRECAUTIONS**STORAGE & HANDLING**

Protect containers against physical damage.

Keep away from heat, sparks, and flame.

Keep in tightly closed container. Wash thoroughly after handling.

SECTION X. MISCELLANEOUS INFORMATION

Avoid contact with eyes, skin, or clothing.

Avoid breathing vapor.

Use with adequate ventilation.

Avoid prolonged or repeated contact with skin.

Date issued: _____

Revision: _____

Approved by R. M. Mitchell

Manager, Quality Assurance

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary. We reserve the right to revise Material Safety Data Sheets from time to time as new technical information becomes available. The user has the responsibility to contact the company to make sure that the sheet is the latest one issued.

2926

MATERIAL SAFETY DATA SHEET
OSHA "Hazard Communication" Rule (29 CFR 1910.1200)
SECTION I - MANUFACTURER AND PRODUCT

Boehringer Mannheim Biochemicals
Division of Boehringer Mannheim Corporation
7941 Castleway Drive
P.O. Box 50816
Indianapolis, IN 46250
Telephone: (317) 845-2000

Product Name (Synonym) and Catalog Number
Triton® X-100
Cat. No.: 789 704, 743 119

SECTION II - HAZARDOUS INGREDIENTS

Exposure Limit or Toxicity Data
Acute oral (rats) LD50: 1800 mg/kg

CAS Number
9002-93-1

SECTION III - PHYSICAL DATA

Boiling Point °C	Vapor Pressure (mmHg)	Vapor Density (Air=1)	Solubility in Water	Specific Gravity (H ₂ O=1)	Evaporation Rate (Butyl Acetate)	Appearance and Odor
520°F	0.05	Unknown	Complete	Unknown	Unknown	Clear to hazy liquid, mild odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method)	Flammable Limits Lel% Uel%		Extinguishing Media	Special Fire Fighting Procedures or Unusual Fire and Explosion Hazards
300°F (oc)	n.a.	n.a.	CO ₂ , dry chemical or water	None obvious

SECTION V - HEALTH HAZARD DATA

Effects of Exposure: Irritant to skin and eyes

Emergency and First Aid Procedures: If inhaled move to fresh air. For eye and skin contact, flush with large amounts of water. If ingested, induce vomiting carefully and prompt lavage is indicated. Contact a physician in all cases.

SECTION VI - REACTIVITY DATA

P. 2

<u>Stability</u>		<u>Conditions to Avoid</u>	<u>Incompatibility Materials to Avoid</u>
Stable	Unstable		
Stable		Heat	Oxidizing or reducing agents may be explosive

Hazardous polymerization: Will not occur

SECTION VII - SPILL OR LEAK PROCEDURES

Spill: Recover spilled liquid for disposal in a safe manner. Wear protective equipment.

Waste Disposal: Dispose of according to all local, state and federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH approved dust/mist respirator.

Ventilation: General room ventilation is satisfactory, local ventilation when necessary.

Protective Gloves: Rubber

Eye Protection: Safety glasses with side shields or chemical safety goggles.

Other Protective Equipment: Safety shower and eye wash should be available. Use a safety pipet device.

SECTION IX - SPECIAL PRECAUTIONS / COMMENTS

Isooctylphenoxypolyethoxyethanol is a synonym for Triton X-100.

Copy Date: Nov. 20, 1985

Responsible Party: Dale Matis

DISCLAIMER

THE INFORMATION, DATA AND RECOMMENDATIONS CONTAINED HEREIN ARE BASED UPON INFORMATION BELIEVED BY BOEHRINGER MANNHEIM CORPORATION ("BMC") TO BE ACCURATE. HOWEVER, BMC NEITHER WARRANTS THE ACCURACY OF THIS INFORMATION NOR ASSUMES ANY LEGAL RESPONSIBILITY IN CONNECTION WITH ITS DISSEMINATION. ALL MATERIALS AND MIXTURES MAY PRESENT UNKNOWN HAZARDS AND SHOULD BE USED WITH CAUTION. WHEN NECESSARY OR APPROPRIATE, INDEPENDENT OPINIONS REGARDING THE RISK OF HANDLING OR EXPOSURE SHOULD BE OBTAINED FROM TRAINED PROFESSIONALS.

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Material Safety Data Sheet

PPG

PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272

Approved by U.S. Dept. of Labor as "Essentially similar" to Form OSHA-20

Date: November, 1985

Edition: Eighth

Chemical Name and Synonyms:

1,1,1-trichloroethane; methylchloroform
CAS No. 71-55-6

Trade Name and Synonyms:

Tri-Ethane® 366

Chemical Family: Halogenated Hydrocarbons

Formula: CH_3CCl_3

DOT Shipping Name:

See Comments, Page 2

DOT Hazard Class:

See Comments, Page 2

Reportable Quantity: N/A

See Comments,
I. D. Number Page 2

Subsidiary Risk:

N/A

SECTION 1 • PHYSICAL DATA

Boiling Point @ 760 mm Hg: 72°C	Vapor Density (Air=1): 4.54	Specific Gravity ($\text{H}_2\text{O}=1$): 1.300-1.320 @ 25/25°C	pH of Solutions: 6.0 to 7.5
Boiling Range 72°C-88°C		Bulk Density: 10.80-10.97 lbs/gal @ 25°C	Volume % Volatile: 100
Freezing/Melting Point: -45°C	Solubility (Weight % in Water): Negligible	Heat of Solution: Not Applicable	Appearance and Odor: Clear, colorless liquid with ether-like odor
Vapor Pressure: 135mmHg @ 25°C	Evaporation Rate (ethyl ether=1): 0.35		

SECTION 2 • INGREDIENTS

1,1,1-trichloroethane (Stabilized)
Diethylene ether (CAS No. 123-91-1)
Glycol methylene ether (CAS No. 646-06-0)
Sec butanol (CAS No. 78-92-2)

%

96

NOTE: Hazard information is based upon the tested mixture and not individual ingredients.

SECTION 3 • FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None when tested in accordance with DOT requirements	Flammable Limits in Air (% by Volume) LEL: 7% UEL: 15% (See Below)	Extinguishing Media: Water, dry chemicals or carbon dioxide
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Special Fire Fighting Procedures: Fire fighters should wear NIOSH/MSHA-approved pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possible traces of phosgene.

Unusual Fire and Explosion Hazards: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a high energy spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume. Decomposition or burning can produce hydrogen chloride or possible traces of phosgene.

SECTION 4 • HEALTH HAZARD DATA

Toxicity Data	See References 1-7	Classification (Poison, Irritant, Etc.)
LC ₅₀ Inhalation	(rat) 8,000 ppm/7 hours	Inhalation: Slightly Toxic
LD ₅₀ Dermal	(rabbit) >15 g/kg	Skin: Not Significantly Toxic
Skin/Eye Irritation	See Section 5	Skin/Eye: Liquid mildly irritating to skin; eye irritant
LD ₅₀ Ingestion	(rat) 10-12 g/kg (rabbit; guinea pig) 5.6-9.5 g/kg	Ingestion: Not Significantly Toxic
Fish, LC ₅₀ (Lethal Concentration)	Unknown	Aquatic: Unknown

24-HOUR EMERGENCY ASSISTANCE: (304) 843-1300

SECTION 5 • EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

Permissible Exposure Limits:

OSHA: 350 ppm, 8-hour TWA (time-weighted average); 29CFR 1910.1000

ACGIH: 350 ppm, 8-hour TWA (time-weighted average); 450 ppm, STEL, (15-minute short-term exposure limit).

ACUTE

Inhalation: Tri-Ethane® is primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory system, dizziness, nausea, lightheadedness, headache, loss of coordination and equilibrium, unconsciousness, possible central nervous system damage, even death in confined or poorly ventilated areas. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

Eye/Skin: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin absorption can occur.

Ingestion: Swallowing of this material may result in irritation of the mouth and GI tract with other effects as listed above for Inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC

Tri-Ethane® has been extensively studied for cancer potential. There is no documented evidence to suggest that Tri-Ethane® causes an increased cancer incidence in humans or animals. The EPA's Science Advisory Board concluded that there is no evidence to suggest carcinogenic activity for Tri-Ethane®. 1,1,1-trichloroethane is not listed by IARC, NTP, or OSHA as a carcinogen.

References (continued)

5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1975
7. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980
8. Encyclopedia of Chemical Technology, Volume 5, Third Edition, Kirk-Othmer, 1979
9. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards, DHHS (NIOSH) Publication No. 81-123, January, 1981
10. NIOSH/OSHA Pocket Guide to Chemical Hazards, DHEW (NIOSH) Publication No. 78-210, September, 1978

COMMENTS: Only regulated when shipped by air. DOT Shipping Name is 1,1,1-trichloroethane
DOT Hazard Class is ORM-A, and UN Number is UN2831.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. If irritation occurs, consult a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

Ingestion: If conscious, drink large quantities of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital. DO NOT attempt to give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes): NEVER administer adrenalin following Tri-Ethane® overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to Tri-Ethane®.

SECTION 6 . REACTIVITY DATA

Stability: Stable	Conditions to Avoid: Avoid open flames, hot glowing surfaces or electric arcs.
Hazardous Polymerization: Will not occur.	Conditions to Avoid: None

Incompatibility (Materials to Avoid): Avoid mixing with caustic soda, caustic potash, or oxidizing materials. Shock sensitive compounds may be formed.

Hazardous Decomposition Products: Hydrogen chloride and possible traces of phosgene.

SECTION 7 . SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Spilled or Released: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection (See Section 8) should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover spilled material on adsorbents, such as sawdust and vermiculite, and sweep into closed containers for disposal. After all visible traces, including ignitable vapors, have been removed, thoroughly wet vacuum the area. DO NOT flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal.

Waste Disposal Method:

Contaminated sawdust, vermiculite, or porous surfaces must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant federal, state, or local laws/regulations regarding disposal.

SECTION 8 • SPECIAL PROTECTION INFORMATION

Respiratory Protection: Use a half or full facepiece organic vapor chemical cartridge or canister respirator when concentrations exceed permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operation in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH or MSHA. The respirator use limitations made by NIOSH/MSHA^{9,10} and by the manufacturer must be observed. Respiratory protection programs must be in accordance with 29CFR 1910.134.

Ventilation (Type): Use local exhaust or dilution ventilation as appropriate to control exposures to below permissible limits.

Eye Protection: Splashproof goggles

Gloves:

Viton®. For limited service only:
Polyvinyl alcohol*, Nitrile, Butyl,
Neoprene. *(degrades in water)

Other Protective Equipment: Boots, aprons, or chemical suits should be used when necessary to prevent skin contact. Personal protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storing:

- Do not use in poorly ventilated or confined areas without proper respiratory protection (See Section 8).
- Tri-Ethane® vapors are heavier than air and will collect in low areas.
- Keep container closed when not in use.
- Store only in closed, properly labeled containers.
- Liquid oxygen or other strong oxidants may form explosive mixtures with Tri-Ethane®.
- This material or its vapors when in contact with flames, hot glowing surfaces, or electric arcs can decompose to form hydrogen chloride and possible traces of phosgene.
- AVOID CONTAMINATION OF WATER SUPPLIES. Handling, storage, and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
- Do not store or stack aluminum in contact with Tri-Ethane® to prevent possible solvent decomposition (stacking corrosion).
- Caution should be taken not to use in pressurized or totally enclosed system of aluminum construction. Example: paint or adhesive spray system.
- A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
- Do not use cutting or welding torches on empty drums that contained Tri-Ethane® unless properly purged and cleaned.

Other Precautions:

- Do not breathe vapors. High vapor concentrations can cause dizziness, unconsciousness, possible central nervous system damage or death.
- Use only with adequate ventilation. Ventilation must be sufficient to limit employee exposure to Tri-Ethane® below permissible exposure limits. Observance of lower limits (outlined in Section 5) is advisable.
- Avoid contact with eyes. Will cause irritation and pain.
- Avoid prolonged or repeated contact with skin. May cause irritation or dermatitis.
- Do not swallow. Swallowing may cause injury or death.
- Do not eat, drink, or smoke in work areas.

References:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1975
 2. Industrial Hygiene and Toxicology, Volume II, Second Edition, F. A. Patty, 1963
 3. Dangerous Properties of Industrial Materials, Fourth Edition, N. I. Sax, 1975
 4. Industrial Toxicology, Hamilton and Hardy, 1974
- (References continued on page 2)

[Handwritten signature]

UREA

MAR 1986 4715

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Carbamide, Carbonyl diamine, Carbamide acid and others; CAS 57-13-6.

Trade Names: Prespersion, 75 Urea, Ureaphil, Ureophil, B-I-K, Varioform II, Urevert and others.

Uses: Used in fertilizers and animal feeds, in the manufacture of resins and plastics, as a stabilizer in explosives and in medicines, and others.

PHYSICAL INFORMATION

Appearance: White crystals or powder.

Odor: Similar to ammonia.

Behavior in Water: Highly soluble.

HEALTH HAZARD INFORMATION

OSHA Standard: None established. (If considered a nuisance dust--15 mg/m³)

NIOSH Recommended Limit: None established.

ACGIH Recommended Limit: None established. (If considered a nuisance dust--10 mg/m³)

Short Term Exposure:

Inhalation: Dust may cause difficult breathing especially if the person has asthma.

Skin: May cause burning or stinging of the skin and mild irritation.

Eyes: May cause irritation.

Ingestion: There have been no reported cases of human toxicity. However some toxic effects have been seen in sheep with impaired liver function.

Long Term Exposure:

No information available.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How toxic is Toxic" available from the New York State Department of Health.

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: If breathing has stopped, give artificial respiration. Seek medical attention, if necessary.

Skin: Wash area thoroughly with soap and water for at least 5 minutes. Seek medical attention, if necessary.

Eyes: Wash eyes with plenty of water for at least 15 minutes. Seek medical attention.

FIRE AND EXPLOSION INFORMATION

General: Considered non-flammable.

REACTIVITY

Conditions to Avoid: Avoid high temperatures. Will decompose to ammonia, carbon monoxide and/or carbon dioxide.

Materials to Avoid: Avoid contact with gallium perchlorate and strong oxidizing agents (permanganate, dichromate, chlorine and others). Contact with hypochlorites can result in the formation of explosive compounds.

PROTECTIVE MEASURES

Storage and Handling: No special measures required.

Engineering Controls: No special measures required.

Protective Clothing: No special measures required.

Protective Equipment: No special measures required.

PROCEDURES FOR SPILLS AND LEAKS

Sweep onto paper. Place in fiber carton. Wash spill area well with soap and water.

For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Tower Building, Albany, New York 12237.



QUICK IDENTIFIER (In Plant Common Name)
~~URESOLVE HF/URESOLVE PLUS~~
~~URESOLVE PLUS S.G./URESOLVE PLUS 500~~

Manufacturer's Name **DYNALLOY, INC.**

Telephone No. (201) 887-9270

Address 7 GREAT MEADOW LANE, HANOVER, N. J. 07936

Telex No. 642-033

Preparer's Name JAY W. PARTON

Date Prepared 3/86

SECTION 1 - IDENTITY

Common Name: (used on label)	URESOLVE HF/URESOLVE PLUS	Cas No.	
(Trade Name & Synonyms)	(URESOLVE PLUS S.G./URESOLVE PLUS 500)		N/A
Chemical Name	N/A	Formula	N/A
		Chemical Family	SOLVENT
DOT Hazard Classification (49 CFR)	Proper Shipping Name	UN or NA Number	IATA Article Number
COMBUSTIBLE LIQUID	COMPOUND, CLEANING LIQUID	NA 1993	UN 1993

SECTION 2 - HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical & common name(s))	Cas No.	%	Threshold Limit Value (units)
			25 PPM (SKIN) OSHA
ETHYLENE GLYCOL MONOMETHYL ETHER	109-86-4	60-80	29 CFR PARA .1910.1000
			TABLE Z-1
			5 PPM (SKIN) ACGIH, 1984-85.
FOR WOMEN OF CHILDBEARING POTENTIAL: PEL - 2 PPM (8 HOUR TWA), SHORT TERM EXPOSURE LIMIT - 5 PPM (15 MIN. TWA EXCURSION, NO MORE THAN 4 TIMES DAILY WITH A MINIMUM SEPARATION OF ONE HOUR).			
FOR OTHER PERSONS: PEL - 5 PPM (8 HOUR TWA) ACGIH, 1984-85.			
POTASSIUM HYDROXIDE	1310-58-3	2-4	TWA - NONE
			2MG./CU.M IS SUGGESTED

SECTION 3 - PHYSICAL & CHEMICAL CHARACTERISTICS (Fire & Explosion Data) (ETHYLENE GLYCOL MONOMETHYL ETHER)

Boiling Point	256°F.	Specific Gravity (H ₂ O=1)	0.97	Vapor Pressure (mm Hg)	6.2 AT 20°C.
Percent Volatile by Volume (%)	100	Vapor Density (Air = 1)	2.62	Evaporation Rate (BU AC = 1)	0.62
Solubility in Water	COMPLETE	Reactivity in Water	N/A		
Appearance and Odor	(MIXTURE) BLUE TO GREEN LIQUID, SLIGHT PLEASANT ODOR.				
Flash Point	(MIXTURE) 135°F. CC in Air % by Volume	Lower	Upper	Extinguisher	Auto-Ignition Temperature
		2.5	19.8	WATER SPRAY, CO ₂ , ALCOHOL FOAM, DRY CHEMICAL	N/A
Special Fire Fighting Procedures	USE SELF-CONTAINED BREATHING APPARTUS AND PROTECTIVE CLOTHING.				

Unusual Fire and Explosion Hazards NONE

SECTION 4 - PHYSICAL HAZARDS

Stability	Unstable <input type="checkbox"/> Conditions Stable <input checked="" type="checkbox"/> to Avoid	Incompatibility (Materials to Avoid)	STRONG OXIDIZING AGENTS
Hazardous Decomposition Products	CO AND CO ₂	Hazardous Polymerization	May Occur <input type="checkbox"/> Conditions Will Not Occur <input checked="" type="checkbox"/> to Avoid N/A

SECTION 5 - HEALTH HAZARDS

Signs and Symptoms of Exposure 1. Acute EYE AND SKIN IRRITATION, HEADACHE, DIZZINESS, DROWSINESS. Overexposure FATIGUE, NAUSEA, VOMITING, TREMOR, CONFUSION.

2. Chronic REPEATED OVEREXPOSURE MAY CAUSE INJURY TO BONE MARROW AND BLOOD CELLS, Overexposure KIDNEY, LIVER, AND TESTES.

Medical Conditions Generally Aggravated by Exposure N/A

Chemical Listed as Carcinogen or Potential Carcinogen	National Toxicology Program	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	I.A.R.C. Monographs	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	OSHA	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
OSHA Permissible Exposure Limit	ACGIH Threshold Limit Value	N/A	Other Exposure Limit Used	N/A		

Emergency and First Aid Procedures

1. Inhalation REMOVE TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN AND CALL A PHYSICIAN.

2. Eyes FLUSH WITH WATER FOR 15 MINUTES. CALL A PHYSICIAN.

3. Skin REMOVE CONTAMINATED CLOTHING AND FLUSH WITH WATER.

4. Ingestion INDUCE VOMITING. CALL A PHYSICIAN.

SECTION 6 - SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type) NIOSH-APPROVED RESPIRATOR FOR HIGH CONCENTRATIONS.

Ventilation	Local WELL VENT- Exhaust ILATED AREA	Mechanical (General)	EXHAUST HOOD	Special EXPLOSION PROOF MOTOR	Other N/A
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Protective Gloves	BUTYL RUBBER	Eye Protection	SAFETY GLASSES
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Other Protective Clothing or Equipment IMPERMEABLE APRON

SECTION 7 - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage DO NOT BREATHE VAPOR, USE WITH ADEQUATE VENTILATION. DO NOT GET IN EYES, ON SKIN, OR CLOTHING. ACCIDENTAL CONTACT SHOULD BE WASHED AWAY IMMEDIATELY.

Other Precautions KEEP AWAY FROM HEAT AND FLAME. KEEP CONTAINER CLOSED

Steps to be Taken in Case Material is Released or Spilled WEAR SUITABLE PROTECTIVE EQUIPMENT. SMALL SPILLS SHOULD BE FLUSHED WITH LARGE QUANTITIES OF WATER. LARGES SPILLS SHOULD BE COLLECTED FOR DISPOSAL.

Waste Disposal Methods INCINERATE IN A FURNACE WHERE PERMITTED UNDER APPROPRIATE FEDERAL, STATE, AND LOCAL REGULATIONS.

1. DATA LISTED IN SECTION 3 (EXCEPT WHERE NOTED AS "MIXTURE") IS FOR THE PRINCIPLE INGREDIENT, ETHYLENE GLYCOL MONOMETHYL ETHER.
2. THIS PRODUCT(S) IS REGISTERED WITH TSCA #4010482D.
3. IN LABORATORY INHALATION STUDIES OF ETHYLENE GLYCOL MONOMETHYL ETHER. BIRTH DEFECTS, INCREASED FETAL LETHALITY, AND DELAYED FETAL DEVELOPMENT HAVE BEEN OBSERVED IN OFFSPRING OF FEMALE ANIMALS EXPOSED TO CONCENTRATIONS IN AIR OF 50 PPM AND HIGHER.
4. ETHYLENE GLYCOL MONOMETHYL ETHER IS LISTED AS A HAZARDOUS SUBSTANCE UNDER OSHA 29 CFR 1910.1000 - 1910.1046.
5. POTASSIUM HYDROXIDE IS LISTED AS A HAZARDOUS SUBSTANCE UNDER 40 CFR 116.4. ITS REPORTABLE QUANTITY IS 1,000 POUNDS.
6. BY DILUTING SPENT SOLUTION WITH 20 TIMES VOLUME OF WATER, THIS MATERIAL(S) WILL NOT BE LISTED AS A POTENTIAL HAZARDOUS WASTE UNDER 40 CFR 261 SUB C AND D. FLASHPOINT WILL BE ABOVE 140° F. CC.
7. PROPER SHIPPING NAME FOR IATA IS "FLAMMABLE LIQUID, NOS (CONTAINS ETHYLENE GLYCOL MONOMETHYL ETHER)".

IMPORTANT



MATERIAL SAFETY DATA SHEET

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J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

CHEMICAL NAME

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Xylenes	FORMULA C₆H₄(CH₃)₂
SYNONYM OR CROSS REFERENCE	CAS NO: EPA NO: 1330207

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL Contains some ethylbenzene	NATURE OF HAZARD
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SECTION III. PHYSICAL DATA

BOILING POINT	MELTING POINT
VAPOR PRESSURE	SPECIFIC GRAVITY 0.86
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Insoluble	EVAPORATION RATE (_____ = 1)
APPEARANCE Liquid	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) 75°F. (cc)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA Water spray, alcohol foam, dry chemical or carbon dioxide.			
SPECIAL FIRE-FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE 100 ppm; 435 mg/M³ ori-rat LD₅₀: 4300 mg/kg
HEALTH HAZARDS Harmful if inhaled. Causes irritation
FIRST AID PROCEDURES

If swallowed, do not induce vomiting. Call a physician. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician.

SECTION VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Heat, sparks, flame.
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Oxidizing material

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII. SPILL AND DISPOSAL PROCEDURES**SPILLS**

Eliminate all sources of ignition. Absorb spill on sand, earth or vermiculite. Carefully sweep up and remove. Flush spill area with water. Alternatively use J.T.Baker's Flammable Solvent Clean-Up Kit (Product No. 4437)

DISPOSAL

Burn above mixture in a furnace if local environmental regulations permit.

SECTION VIII. PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Have all-purpose cannister mask available

VENTILATION	LOCAL X	SPECIAL
	MECHANICAL (general) X	OTHER

PROTECTIVE GLOVES

Rubber gloves

EYE PROTECTION

Face shield

OTHER PROTECTIVE EQUIPMENT

Approved working clothes

SECTION IX. HANDLING AND STORAGE PRECAUTIONS

STORAGE & HANDLING

Keep away from heat, sparks and flame. Keep in tightly closed container.

SECTION X. MISCELLANEOUS INFORMATION

Avoid breathing vapor. Avoid contact with eyes, skin, clothing. Wash thoroughly after handling.

Date issued: 4/17/78Approved by: [Signature]

Manager, Quality Assurance

Revision No. & Date issued: _____

The information provided in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the users responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary for use in the laboratory. Re-evaluate from time to time as new technical information becomes available. The